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DEPARTMENT OF STATE
AGENCY FOR INTERNATIONAL DEVELOPMENT
Washington, D.C. 20523

Proposal and Recommendations
For the Review of the
Development Loan Committee

LIBERIA - TELECOMMUNICATIONS EXPANSION

AID-DLG/P-1092

UNCLASSIFIED

DEPARTMENT OF STATE
AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON, D.C. 20523

Unclassified

AID-DLC/P-1092

June 6, 1973

MEMORANDUM FOR THE DEVELOPMENT LOAN COMMITTEE

SUBJECT: Liberia - Telecommunications Expansion

Attached for your review are the recommendations for authorization of a loan in an amount not to exceed \$8,500,000 to the Public Utilities Authority of the Republic of Liberia to assist in financing the foreign exchange and local currency costs of goods and services for the construction of an expanded telecommunications system, including related management and maintenance training, and the procurement of related support equipment.

This loan proposal is scheduled for consideration by the Development Loan Staff Committee at a meeting on Monday, June 11, 1973.

Development Loan Committee
Office of Development
Program Review

Attachments:

Summary and Recommendations
Project Analyses
ANNEXES A - K

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SUMMARY AND RECOMMENDATIONS

1. Borrower: The Public Utilities Authority (PUA) a specialized agency of the Government of Liberia (GOL) on behalf of the Telecommunications Division (LTA). The GOL will repay the loan.

2. Amount of Loan: \$8,500,000.

3. Terms of Loan: The loan will be a two-step loan: 1) Terms to the PUA will be for a period of 30 years with a grace period of 5 years. Interest will be at a rate of 3½%. 2) PUA will service the loan to the GOL, and the GOL will service the loan to the U.S. Terms to GOL will be for 40 years with a grace period of 10 years. Interest will be at a rate of 2% during the grace period on disbursed amounts, and 3% during the remaining 30 years. Repayment will be in U.S. dollars.

4. Total Cost of Project: \$10,500,000

		<u>Foreign Exchange</u>	<u>Local Currency</u>	<u>Total</u>
AID Contribution	\$ 8,500,000	\$8,033,000	\$ 467,000	\$8,500,000
GOL Contribution	\$ 2,000,000	<u>\$1,103,000</u>	<u>\$ 897,000</u>	<u>\$2,000,000</u>
		\$9,136,000	\$1,364,000	\$10,500,000

5. Description of Project: The Project consists of the following components: (a) the engineering design and supervision of the expansion of the Liberia Telecommunications System; (b) the procurement and installation of equipment and materials required for the expansion, including a limited period of maintenance and operations training after installation; (c) the continuation of the management maintenance, and operations training provided under the present GT & E contract; (d) rehabilitation and maintenance of Liberia's existing Telecommunications System.

6. Purpose of Activity: The objective of the project is to provide reliable national and international telecommunications service for Liberia. The project is the first phase of a plan developed by General Telephone and Electronics (GT&E) for the orderly expansion of the Liberia Telecommunications System, consistent with forecasts of demand growth until 1992.

7. Background of Project: In 1968, the GOL requested A.I.D. grant assistance in the rehabilitation and expansion of the country's communications system. Consequently, A.I.D. agreed in May, 1971 to provide management and training services to the PUA Telecommunications Division (LTA) under a contract with GT&E. The contract also provided for the preparation of a financial, technical, and economic study to present justification for financing the system's expansion. This study was completed in April, 1973 and has been used as the basis for the GOL's request for A.I.D. loan assistance.

8. Export-Import Bank Interest: Ex-Im clearance obtained January 3, 1973.

9. Views of AID and U.S. Mission: The loan is recommended by the Embassy in Monrovia, USAID/Liberia, and the Regional Economic Development Services Office/West Africa (REDSO/WA).

10. Statutory Criteria: The loan will meet all Statutory Criteria. See Annex K.

11. Issues: None.

12. Recommendations Authorization of a two-step loan to the Public Utilities Authority in the amount of \$8,500,000 in accordance with the terms and conditions set forth in the proposed Loan Authorization in Annex K.

CAPITAL ASSISTANCE COMMITTEE MEMBERS:

Project Officer and Chairman.....	L. Reese Moyers, REDSO/WA
Counsel.....	John W. Roxborough, REDSO/WA
Telecommunications Advisor.....	Samuel Lubin,] AFR/DS
Engineers.....	A. Hotvedt, AID/W
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	Julius E. Coles, USAID/Liberia

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I. INTRODUCTION

A. Project Description

The project will consist of the engineering design, procurement and installation of equipment and materials for the rehabilitation and expansion of the Liberia Telecommunications System. The expansion plan follows recommendations made in a study conducted by General Telephone and Electronics (GT&E) under an A.I.D. grant financed contract with the Public Utilities Authority/Telecommunications Division. Using this study, the GOL has determined the most viable plan for the total expansion program. In addition, the project provides for the continuation of management, maintenance, and operation training now being provided under the present contract, as well as, a limited period of contract maintenance support for the A.I.D. financed expansion project.

The total project cost is estimated at \$10,500,000. The project will include projected telecommunications growth requirements for Liberia through 1976 and the following specific items will be financed under A.I.D. loan:

- 1) An amendment to the present GT&E contract, or an award to another contractor, to provide a comprehensive training program and an extended period of management services.
- 2) The engineering design, preparation of IFB documents and supervision of:
 - a) the procurement and installation of equipment for 4,000 new telephones (lines) and outside plant equipment and materials for the Monrovia Area, and
 - b) the upgrading of the Monrovia-Harper coastal microwave link.
- 3) The procurement and installation of two new international circuits, and the procurement of certain communications support equipment.
- 4) One or more maintenance and rehabilitation contracts. The purpose of these contracts will be to provide services to rehabilitate and maintain the existing system until a sufficient number of LTA staff is trained under the Management and Training Contract.

B. Relationship to AID Program

A.I.D. assistance in the improvement in Liberia's infrastructure conforms to the GOL's development objectives. Through the reactivation in 1972 of Liberia's National Planning Council, the GOL established its development priorities, one of which is "integrated development through balanced regional planning and growth in the Transportation and Communications Sectors." This priority is in support of the GOL's objective to maximize the country's existing infrastructure and supplement it wherever necessary to increase economic progress. During the period of A.I.D. involvement in Liberia the U.S. has provided substantial assistance to the Transportation Sector with two loans for the

construction of rural roads. AID now proposes a major program in response to the GOL's priority for improvements in the Communications Sector. Preparation for the expansion of the Telecommunications System was initiated through the January, 1972 contract between GT&E and the PUA/Telecommunications Division (LTA) designed to assist in establishing and operating an effective telecommunications agency. Basic among the responsibilities of the GT&E's management contract is to prepare a plan for the expansion of the system to meet forecasted demand over the next 20 years. This plan has been completed, and was used as primary justification in the GOL's request for AID loan financing of the initial expansion.

The proposed project will not only satisfy domestic demand, but will also tie in closely with other regional telecommunications projects. The upgrading of the Monrovia-Harper coastal microwave link will permit connection to the new earth satellite station in Abidjan, and will provide access to the planned Pan-African Network.

C. Borrower

The Borrower is the Public Utilities Authority (PUA), a semi-autonomous agency of the GOL established under legislation passed in January 1972 which made it responsible for all public power, water, sewer and communications systems throughout Liberia. The Authority has the power to borrow and contract debts with domestic and international financial institutions.

The financial projections for the LTA are based on a short term data base. During loan agreement negotiations there will be discussions concerning the possibility that in the early years of heavy capital investment the GOL may need to financially assist the LTA to meet its expenses. Also, during the implementation of the project A.I.D. and the GOL will hold discussions to determine if the interest rates presently granted to the PUA are high enough in comparison to the LTA's actual repayment ability.

The LTA will be the implementing agency. As mentioned earlier, in January 1972, AID grant financed a contract between GT&E and the PUA to develop within the LTA the capability to operate a financially viable national and international telecommunications system. A general manager and sixteen technicians are presently working within all branches of the LTA, including Personnel, Accounting, Commercial, and Operations. These technical assistance personnel are charged with the objective of training their counterpart Liberian staff in all the technical and managerial skills needed to take increasing responsibility for the system's operation.

The LTA is organized as a self-liquidating revenue producing activity. Since it is not subsidized by the Government, GT&E is instituting financial planning techniques which will permit the accumulation of surpluses from operating revenues to be used for plant rehabilitation, future system expansion and recurrent expenses. Further details on the financial status of the LTA are found in the Financial Analysis Section.

The LTA itself is a semi-autonomous agency under the control of the PUA. This resulted from January 1972 legislation which established the PUA and made it responsible for all power, water, sewer, and communications systems. This Legislation is an effort to have the various utilities become self-sustaining businesses which are capable of providing service to the public while operating as an efficient profitable unit. The LTA is headed by an Executive Officer with five staff department managers, composed of the Controller, Operations Manager, Chief Engineer, Commercial Manager and Personnel-Traffic Manager. Each department head reports directly to the Executive Officer. The LTA currently has approximately 390 employees including some 25 middle level technicians. It is intended that the GT&E contract will be extended or another contract will be financed under this loan to provide a comprehensive maintenance training program, and to continue certain management assistance for an additional three years of contractor services beyond the present GT&E contract.

D. Project History and Background

Liberia's present telecommunications system was completed in 1965 at a cost of \$8.3 million. R.C.A. installed radio transmitters, receivers, towers, antennas, and power supplies at an approximate cost of \$4.6 million, and the L.M. Ericsson Company of Sweden installed the telecommunications central office equipment and outside plant equipment which cost about \$3.7 million. The Monrovia Central Office was installed with 2000 lines and the Monrovia-Sinkor Branch Office with 1000 lines. In less than one year both offices were operating at full capacity. From the completion of the system's installation until March, 1972 the GOL financed maintenance service contracts with both RCA and Ericsson.

Prior to January, 1972 responsibility for operating the Telecommunications System was placed with the Postal Department, and later with an independent Telecommunications Authority. During the 1965-1972 period the System was plagued with poor management and continuous budgetary deficits. These problems were compounded by the fact that the designers of the original system did not make careful calculations of the country's future demands. Thus, in July, 1968 the GOL requested AID assistance in expanding the country's communications system. However, after a review of the operations, management, and maintenance of the system, AID determined that the primary need, before any expansion could be considered, was a reorganization of the Telecommunications Authority. At that time the GOL and AID decided that since the Authority was to become a self-sufficient operation, a management team approach would best fit its needs.

This decision resulted in AID's May 1971 agreement to provide management and training services to the Authority and the subsequent grant financed contract with GT&E. Thus, the operation of the system is now a joint effort between existing management and an outside management team. The terms of the GT&E contract call for a study to plan the orderly expansion of the system consistent with forecasts of demand growth, and to prepare the financial, technical, and economic analysis necessary to obtain financing for such expansion. This study is the basis for the proposed AID loan for the expansion of the system.

This project was presented as an interim FY '73 loan proposal in USAID/Liberia's budget submission, and in January 1973 an application was received from the Government of Liberia requesting AID assistance in financing the expansion.

E. EX-IM Clearance

On January 3, 1973, EX-IM concluded that this project was more appropriate for AID financing because of the need for concessional terms in Liberia's medium term debt position.

II. ENGINEERING ANALYSIS

A. Description of the Existing System

The Liberia Telecommunications Systems consists of the following facilities:

1. The Monrovia Main Central Office - a 2,000 line automatic cross-bar (X Bar) exchange.
2. The Monrovia Sinkor Branch Office - a 1,000 line automatic X Bar exchange.
3. Ten up-country offices located at Robertsport, Harper, Kokota, Salala, Gbarnga, Harbel, Buchanan, Greenville, Sanequelle, and Careysburg. Each office, except for Harper and Buchanan have a capacity of 30 lines each.
4. A microwave network serving Harbel, Buchanan, and Greenville with 30 circuits of which 20 continue on to Harper. A second microwave network connecting Monrovia with Kokota, Salala, Gbarnga, and Sanequelle. A third microwave link connects Monrovia to Robertsport.
5. Single sideband (SSB) radio communication from 4 upcountry locations to Monrovia; from four locations to Gbarnga; and from one location each to Greenville and Robertsport. Gbarnga, Greenville, and Robertsport can retransmit the upcountry messages to Monrovia.
6. An international high frequency (HF) system with circuits operated by the ITA to New York, Frankfurt, Rome, Stockholm, Freetown and Lagos. In addition, France Cable and Radio (FCR) operates a telephone and telegraph circuit to Paris.

All the HF transmitters and antennas are located at the transmitting sites at Paynesville and the receiving station is at Brewerville. (A detailed map of the existing system is shown in Annex A, Figure A-1). Items 1, 2, and 3 above were manufactured and their installation completed in 1965 by L.M. Ericsson Co. (LME) of Sweden at a cost of \$3.7 million. Item 4 is an obsolete RCA vacuum-tube type system installed in 1965 at a cost of \$4.6 million. The SSB equipments comprising Item 5 are 15 years old.

The international circuit transmitters consist of five 10 kw and two 1 kw units of 1960 vintage and of various makes plus a 1950 Wilcox transmitter used for ship to shore traffic. The receiving station consists of a hodge-podge of receivers of 1940 vintage which have been modified at various times. The system's outside plant consists of aerial cable mostly underbuilt on electric power poles with intermediate poles to support the cables where the power conductor spans are too long.

All of the equipment in the system, with the exception of the LME automatic exchange at Monrovia Main and Monrovia Sinkor and the 10 out-country central offices, is outdated, in poor physical condition, requires excessive maintenance, and in many cases no spare parts are obtainable for it. The outside plant is also in poor condition, the messenger wires are too weak to properly support the aerial cables and are also badly corroded. The cable itself has many faults due to punctures from lightning strokes. Connections (drop wires) to customer stations are in poor condition, with the drop wires frequently shorted and the connections improperly fused or grounded. The Monrovia Main and Sinkor Branch exchanges are badly overloaded making calls during busy hours almost impossible. The poor physical condition of the outside plant prevents any form of reliable communications in the Monrovia area.

Interurban communication is even less reliable and long interruptions are frequent due to failures of the microwave equipment. Since there are no access roads to five of the relay stations beyond Kabli on the RCA coastal network to Harper, any repairs or refuelling of the diesel electric generators requires the chartering of an aircraft. Due to power voltage fluctuation tube failures are frequent. Total cost of maintenance per station for these five relays averages about \$1,000 per month.

Service on the international circuits suffers from frequent failures of transmitting and receiving equipment and unavailability or long delivery time for spare parts. One of the 10 kw transmitters has been out of service for a year and has been cannibalized to provide spare parts for the other four units. As there are insufficient standby units a failure can cause lengthy shutdown of an international circuit.

The entire LTA system is thus in dire need of rehabilitation or replacement of its older components and expansion of the newer LME central offices to meet existing unfilled demand and future growth. New offices and service to presently unserved points are required to meet the developing needs of the country.

B. Present Maintenance Capability

The LME and PCM microwave equipment were maintained by the two firms under servicing contracts which expired in March 1972 and were not renewed. A \$1.9 million contract, partly financed by AID, was signed in January 1972 between the LTA and General Telephone and Electronics Corporation of Waltham, Mass. (GTE), to provide management, operating and maintenance training for the LTA and to assist LTA technical personnel in the maintenance and emergency rehabilitation of some of the down equipment. The contract provided a small fund for procurement of emergency spares for the latter purpose.

The present LTA management, operations, and maintenance staffs including the GT&E contract personnel are described in Annex B.

C. Proposed System

The GT&E contract also required the contractor to study and plan the rehabilitation of the system, its orderly expansion consistent with the forecasts of present and future demand, and to prepare the financial, technical and economic analyses needed to obtain financing for such expansion. The proposed system is based on the information supplied by GT&E to the LTA in January and April 1973 in fulfillment of their contract requirements.

Details of telephone station (customer) demand forecasts are given in Annex C; national and international traffic forecasts for telephone, telex, and telegraph services are shown in Annex D; details of equipment requirements to meet the forecast demand and cost estimates for engineering and construction are presented in Annex E. Annex E contains a long-term, 20 year master plan and the near-term plan to be financed under the proposed ATD loan. Detailed cost estimates are provided for the near-term plan and estimates of sufficient accuracy for the economic and long-term financial analyses are given for the balance of the 20 year forecast.

The existing rate schedule of the LTA is presented in Annex F. The GT&E consultant has determined that the existing rate schedule is consistent with the cost of service for each class of service (commercial, residential, government) and will not discourage healthy growth of demand. It will provide a reasonable return to the LTA sufficient to assure debt repayment, provide adequate service and allow for replacement of worn out or obsolete equipment.

Annex G presents the LTA estimated income statement for the 20 year period 1973 to 1992. Revenue estimates are derived from the station and traffic forecasts of Annexes C and D and the rate schedule of Annex F. Annex G also includes a 20 year estimated balance sheet and cash flow projection. Annex H is a calculation of the Internal Rate of Return (IRR) for the 20 year plan based on the revenue and cost estimates in the previous Annexes.

In summary, the 20 year plan consists of the following (a map of the expanded system is shown in Annex A, figure A-2):

1) Items to be financed under the AID loan and by LTA for certain local and third country costs (immediate requirements):

a) Central Office expansion of Monrovia Main and Sinkor exchanges through the addition of 3000 lines to the X BAR automatic exchanges.

b) A new 1000 line X BAR exchange at Paynesville.

c) The addition of 150 interurban trunk line capacity to the national switching system to accommodate increased traffic from upcountry exchanges.

d) Replacement of 3 upcountry exchanges of 30 line capacity with 90 line offices and removal of the 3 replaced offices to new locations or for use to expand existing offices.

e) Addition of a total of 200 lines to 6 additional upcountry offices.

f) Provision of 62 new teletype terminals to replace 42 worn out units and provide for 20 new Telex customers.

g) New and larger emergency standby generators for the international transmitter and receiver sites and for the new Paynesville exchange.

h) Replacement of the obsolete RCA coastal microwave link from Monrovia to Harper with a high capacity microwave and troposcatter system to provide reliable internal service and to interconnect with the Africa Regional Microwave System from Freetown to Lagos. (See separate discussion of this link and its regional aspects in 15. D. below).

i) Ten new SSR transceivers to replace existing 15 year old units.

j) Rehabilitation and expansion of the Monrovia-Sanequelle microwave link and rehabilitation of the Monrovia-Robertsport link.

k) An additional HF circuit to New York and a direct HF circuit to Beirut to accommodate increased traffic.

l) New HF transmitters, receivers, antennas, and auxiliary equipment to permit maintenance and repair of existing equipment without interruption of service on international circuits.

m) Buildings and auxiliary construction (to be financed by LTA):

1) Warehouse and garage in the Monrovia area for

storage of materials and housing and repair and maintenance facilities for maintenance vehicles.

- 2) Paynesville Central Office.
 - 3) Access roads to Harbel and Totota microwave sites.
 - 4) Airconditioning and reconditioning of/existing microwave buildings on the Monrovia-Robertsport and Monrovia-Sanequelle links. 40
 - 5) Revisions of the buildings on the Monrovia-Harper route to accomodate the new high capacity microwave and troposcatter equipment.
- n) Major tools for outside plant construction and maintenance (cable trailers, pole trailer, trencher and back-hoe).
 - o) Vehicles: line truck, 5 splicer trucks, 10 repair and supervisor pickups, 3 carryable, 1 sedan, and 1-4 WD carryall.
 - p) New aerial and underground cable for Bushrod Island, Monrovia main Office area, Sinkor Branch area and Paynesville Office to replace existing faulty cables, serve new customers, and connect the new Paynesville Office to the Monrovia Main and Sinkor Offices.
 - q) A contract for rehabilitation and maintenance of the existing system until a sufficient number of LTA staff is trained under the GT&E Management Contract.(financed by LTA).
 - r) Extension of the existing GT&E Management Contract for an additional three years beyond the February 1974 expiration date
 - s) An engineering contract for the design and construction supervision of the proposed ATD-financed project.
 - t) Replacement of faulty subscriber equipment and new-customer installations.
- 2) Long-Term (20 year) Requirements (ATD will not finance):
 - a) A new Monrovia Central Office Building scheduled for 1979.
 - b) A switching center for the Pan Africa Regional network scheduled for 1977 with additions in 1984 and 1985.
 - c) Satellite earth station in 1979.
 - d) Replacement of the Monrovia-Saniqueulle RCA microwave in 1980 and the Monrovia-Robertsport link in 1985.

- e) Added Telex equipment and replacement of worn out units beginning in 1975-6.
- f) New and replaced station connections beginning 1982.
- g) Additional station apparatus (subscriber equipment beginning 1982-3).
- h) Outside plant additions and replacements beginning 1979.
- i) Furniture, tools and vehicles for increased services and replacement of overage units beginning 1977.
- j) Additional consultant services for management and technical training, as required to assist the LTA to manage, operate and maintain the system, including any expansions thereto.

D. West Africa Telecommunications Plan

The Pan-Africa Regional West Africa Telecommunications Plan, sponsored by the International Telecommunications Union (ITU) and the Economic Commission for Africa (ECA) calls for the construction of a microwave system reaching from Lagos, via Cotonou, Lome, Accra, Abidjan, Monrovia, and Freetown to Conakry. At the present time, the Lagos-Cotonou section is in operation; the Cotonou-Lome section is under construction and due to become operational in 1973; the Lome-Accra section is being financed by AID; and the Accra-Abidjan section was being discussed at the ITU sponsored regional conference being held at Lome April 17-19 at the time this CAP was in preparation. It is expected that the African Development Bank will finance this section. 1. Monrovia-Harper System

The existing RCA microwave system between Harper and Monrovia cannot be integrated into the Pan Africa Regional System because of its low capacity, poor signal quality, and unreliability. The proposed replacement of this system under the present AID financed project calls for a microwave link Monrovia-Harbel-Buchanan. Because of the lack of access roads beyond Buchanan it would be impractical to continue on to Harper by microwave which would require at least three relay stations between Buchanan and Greenville and Harper. Recognizing the difficulty and high cost of maintaining the existing microwave system in this area an ITU financed study of the Liberia-Ivory Coast section of the Pan Africa Network executed by the French consulting firm SOPRECOM in September, 1972 recommended that the Buchanan-Greenville-Harper-San Pedro (Ivory Coast) section be implemented by three troposcatter hops. Liberia will, therefore, provide troposcatter equipment Buchanan-Greenville and Greenville-Harper. At Harper a troposcatter terminal will be beamed to San Pedro with the Ivory Coast providing the matching transmitter-receiver equipment at San Pedro. It is expected that the San Pedro station will be in operation concurrently with the completion of the Harper installation. Coordination of this construction is on the agenda of the Lome Conference.

E. Technical Analysis

Forecasts of demand for telephone stations (subscriber equipment) and telephone traffic are difficult to make in the case of Liberia. Until the beginning of operation of the existing GT&E Management Contract, in 1972, there was no system of recording local, interurban, or international traffic on the basis of destination for outgoing calls or origin for incoming calls. Demand forecasts are, therefore, based on actual 1972 available statistics, on observations of busy hour traffic in January and February, 1973, on comparisons between Liberia and other countries in the area with similar economic features, and on the judgement of telecommunications circuit planners.

Three factors have been applied by GT&E in its use of the methodology recommended by the ITU in its report "Economic Studies at the National Level in the Field of Telecommunications, 1964-1968" CCITT/ITU Publication, Geneva, 1 July 1968. The data obtained from applying this methodology was compared with a SOFRECOM study for ITU and a France Cable and Radio (FCR) survey made for the Government of Liberia, both in 1972. In general, the GT&E forecasts fall between the SOFRECOM (high) forecasts and the FCR forecasts (low). A more detailed description of the methodology employed in obtaining the GT&E forecasts is given in Annexes C and D.

A comparison of the 1972 actual international telephone, telex and telegraph traffic with the SOFRECOM and FCR estimates shows the former to be about 30% higher than the actual and the latter very much below the actual. The GT&E forecasts for international telephone traffic (Annex D) are generally about 30% below the SOFRECOM estimates and are, therefore, considered to be conservative.

The following table compares, for illustration, the 1972 actual telephone figures in paid minutes per year with the SOFRECOM and FCR estimates for the same year:

<u>Origin and Destination</u>	<u>Actual</u>	<u>SOFRECOM</u>	<u>FCR</u>
West Africa	3,562	5,601	667
Europe	62,565	98,400	1,939
U.S.A	<u>40,289</u>	<u>63,365</u>	<u>21,307</u>
Total	106,416	167,366	23,913

The demand forecasts in Annexes C and D for stations and traffic were translated by GT&E into Central Office, switching and circuit capacity requirements to meet the demands for the next 8-10 years with provisions for expansion to meet estimated demand up to 20 years (1992). The method used in translating demand into physical requirements is the standard method recommended by the ITU, but was reduced by GT&E by application of a judgemental factor based on experience in the U.S. and developing countries.

Annex C shows a comparison of the number of telephone/100 urban population by the ITU method and the GT&E forecasts based on applying a judgemental factor. The following table summarizes this comparison:

<u>Year</u>	<u>GT&E</u>	<u>ITU (range)</u>
1971	0.25 (actual)	2 - 2.8
1976	1.05	2.3 - 3.2
1982	1.75	2.3 - 3.2
1988	1.08	3 - 4
1992	1.15	3.5 - 4.8

The GT&E forecasts for equipment needs are, therefore, found to be conservative for the 8-10 year period covered by the present project financing. At the same time the equipment design is planned to allow for expansion to take account of future demand even if it should exceed the GT&E forecasts by a significant factor. This represents a reasonable compromise by reducing present investment costs to a minimum without strangling the system by preventing future additions.

F. Cost Estimate

The total project cost is estimated at \$10.5 million. (See Annex E for detailed cost breakdown). This includes the cost of engineering design and supervision; cost of equipment, materials and installation; cost of new buildings and additions or revisions to existing buildings; extension of the existing GT&E management training contract and a separate contract for maintenance of the existing system for a limited period; shipping and handling charges; and a provision for quantity contingency and escalation (see Financial Analysis Section for gross breakdown of AID/GOL financial requirements).

Cost estimates are based on current prices for Central Office Equipment as determined from GT&E and competitive manufacturers' sales prices; catalog prices for Outside Plant Equipment and Materials (cable and wire) with the addition of 25% for line and cable hardware and accessories, which conforms with standard telephone estimating practice; building costs at prices for similar buildings current in Liberia; vehicles and major tools at U.S. catalog prices; packing and shipping charges from factory to Liberia are estimated at 16¢/lb and weights are taken from catalogs or from engineering estimates for specially designed equipment; insurance is calculated at \$3.25/\$1000 valuation.

Estimates for engineering design and supervision were based on U.S. salaries with engineering effort calculated at 1 hour per 6 construction hours. Construction labor was based on various combinations of expatriate and local labor depending on the professional and technical skills required for different components of the system. Contingency and escalation allowances on equipment and materials average 12% and on labor, factors varying from zero to 25% were allowed depending on the particular item, delivery schedules, and the differences between U.S. and Liberian work habits. Costs for the management, training, and maintenance contracts are estimated on the basis of \$50,000 per man year for expatriate personnel.

G. Maintenance of Expanded System

The existing operating and maintenance organization is described in II.B above and in Annex B. The expanded system will require an enlarged operating and maintenance staff and a considerable amount of training to operate and maintain the new equipment. A table of organization for the expanded staff is shown in Annex B, Figure B-3.

The present GT&E Management and Training Contract will be extended for an additional three years following February 1974 (i.e. until February 1977). It will provide for an expanded training program including formal classroom training, on-the-job training, and training of a selected number of supervisory personnel in the U.S. in actual operating company environments. This Contract extension at a cost of \$2.0 million, of which the GOL will cover the full local cost component of \$373,000, will include the services of three instructors for the three year period and also provide for training in the U.S. of selected students to be prepared for supervisory positions. In addition the contract will continue the training advisory services of the following expatriates: General Manager, Controller, Commercial Manager, Operations Manager, Engineering Manager, Rate Expert, Accountant, and Administrative Assistant.

It is intended that as the management capabilities of the LTA counterparts develop, the role of the GT & E consultants will shift from operational to advisory. In this context, it is also intended that GT & E's management services will be gradually phased out over the contract extension period.

The present operating and maintenance staff of the LTA is not yet adequately trained to handle the rehabilitation and maintenance of the existing system for which they assumed responsibility following the expiration of the LME and RCA maintenance contracts in March 1972. The present training program of GT&E began only in October 1972 and has not yet had sufficient time to fully train the necessary Liberian staff to handle the added responsibility. The 10 GT&E technicians primary role is to provide on-the-job training. However, they have been obliged to devote an inordinate portion of this time to assisting in the maintenance and rehabilitation work on the system at the expense of their training duties.

To remedy this situation the LTA will under the proposed project execute one or more maintenance and rehabilitation contracts. They will provide, for a limited time, an adequate number of expatriate technicians to supplement the work of the Liberian technicians on the existing system. These contracts, estimated to cost \$1,143,000 will be financed wholly by the GOL as part of their contribution to the \$10,500,000 total project cost.

Construction contract estimates for the major system components for the expanded system include funds for specific training in the operation and maintenance of new and specialized equipment by the installation contractor. A maintenance period during which the contractor will be responsible for the equipment will also be part of the contract and will provide added opportunity for on-the-job training of Liberian staff.

H. Technical Soundness

The engineering of a complex telecommunications system normally occurs in four stages:

Stage 1 consists of a preliminary engineering study which identifies the system components in enough detail to provide a reasonably firm cost estimate of the system, including the cost of detail design and construction supervision.

Stage 2 involves the preparation of detailed functional specifications for all major equipments and complete procurement specifications for materials such as cables, wires and accessory hardware. However, since major equipments such as automatic exchanges, microwave relays and terminals and certain radio components and antennas vary in their detailed design, arrangement of sub-equipments, size, mechanical layout, and power requirements depending on their suppliers, no detailed design of these units or the buildings to house them can be made by the project engineer. He, therefore, prepares only the detailed functional specifications for such portions of the system.

In Stage 3, the bidders are required to provide details of how they plan to meet the functional specifications and to include sufficient information to permit their proposals to be evaluated for responsiveness to the specifications.

Stage 4 occurs after the contract award. At this time, the successful contractor provides detailed designs of his equipment including space and prime power requirements for approval of the project engineer. After approval these become the design criteria for execution of the construction contract and the engineer can then plan in detail the design of new buildings and the revisions to existing buildings required to house the system components.

The present GT&E preliminary design has identified the system components to the extent required by Stage 1 of the engineering design and has provided a reasonably firm estimate of project cost to meet the requirements of Section 611 of the Foreign Assistance Act. The engineering contract will provide for Stage 2 of the engineering design and a final cost estimate.

III. ECONOMIC ANALYSIS

A. Role of Telecommunications in the Development of the Liberian Economy

Justification for expanding any telecommunications system lies in the relationship between available telecommunications services and increased user demand. Average yearly growth in monetary terms of 7% over the past four years originated in and has been dominated by the enclave sectors of iron ore, logging and rubber. In Liberia not only the businesses operating in these sectors suffer serious consequences from constraints on telecommunications service, but also the business-related government agencies and individual subscribers. Telecommunications perform an integrating function with respect to multinational economic activity for both export activities and inter-African trade. In Liberia one of the principal obstacles in conducting business is the inadequacy of domestic and international telecommunications facilities. Inadequate telecommunications service presently serves as impediment on the absolute level of economic activity, and is resulting in waste or misallocation of available resources, particularly in connection with exports, imports, shipping and banking. In Liberia an improved and expanded system will reduce the cost of trade, encourage exports and imports, and thereby contribute to the growth of the Gross National Product.

The proposed AID financed expansion will not only greatly improve domestic service, but also provide for the connection with the earth station in Abidjan. This link and the addition of two international radio links are required for growth as indicated by the Consultant's traffic forecast. These improvements offer promising prospects for regional cooperation, as well as anticipate Liberia's future requirements for expanded international telecommunications. Scheduled expansion of the facilities in the rural areas will be accomplished through the LTA's internal financing over the next twenty years.

B. Economic Importance of the Project

1. Historical Data and Forecasts

In determining future demand, the consultant obtained economic data concerning population growth, building construction, and family units from available economic studies and outlooks. Interviews were conducted with representatives of the

Liberian Government, U.S. Mission and UNDP to establish data to develop a sound forecast. Practices were initiated to improve collection of central office statistics, and accounting records were updated. In the future, more accurate trends and statistics will be available for estimating additional service requirements. For the most part in Liberia demand for telephone service is unexpressed. This is due to the present non-availability of additional telephone lines, and the unreliability of existing service. Other detrements are the shortage of links to other parts of the world, and the quality of transmission available. Evidence of this non-availability is the Monrovia area itself. The Monrovia Central Office and the Monrovia-Sinkor Branch Office were installed with a total of 3000 lines in 1965, and in less than one year both offices were at full capacity. No additional lines have been added since the initial installation while at the same time the Monrovia area population has grown at 7% per year.

Up-country demand is dependent to a large extent on the development of Government programs. "Balanced and sustained economic progress for all parts of the country and all the people through integrated rural and urban regional development programs in order to accelerate agriculture-based rural development and small scale industries" is the GOL's overall development policy and plan. Reliable telephone service will be an important adjunct to the type of agricultural development and related agro-industry being developed.

2. Economic Activities in Liberia

The following information is a brief review of some of the major areas of foreign and private investment in Liberia. At the same time, these industries are generally the largest private employers. The Consultant/^{also} considered these investment activities to a certain extent in determining the necessity for additional telecommunication facilities.

Iron ore: Exports of iron ore ~~were~~ down in 1971 to 20.9 million tons due to a lag in world steel production. Exports in 1972 ~~has~~ shown an improvement, and it is estimated that production will surpass the 1970 high of 23.2 million tons. This total represents about 70% of Liberia's export earnings. Possible development of the Wologisi deposit near Robertsport area, increased production of existing mines and commencement of new production would have an impact on the telecommunications demand of the Free Port area of Monrovia, as well as Buchanan, which is down the coast.

Forest Products: Value of forest product exports has increased from 32.0 million board feet in 1970 to 49.4 million board feet in 1971, and provided for approximately \$9.0 million in foreign exchange earnings in 1972. President Tolbert has indicated that export of logs will be phased out which will coincide with the development of several new industries. A \$19 million dollar plywood factory will open in 1974 with a good possibility of a wood pulp industry beginning. Saw mills must be built to process logs, and this activity will probably have the greatest impact in the coastal towns of Greenville and Harper and result in increased demand for telecommunications services.

Rubber: Production is still increasing, total export volume increased from 184 million pounds in 1970 to 187 million in 1971. Planting of young trees continues with 286,300 acres planted by 1971. This industry provides about one-fourth of the total paid employment in Liberia and 15% of export earnings. Continued economic growth of the interior region should increase telecommunication requirements.

Agriculture: The Agriculture Sector has been a problem area in the Liberian economy; however, agricultural development has top priority in President Tolbert's announced programs. The Agriculture development budget has increased to \$2.4 million for an increase of 50% over 1970 program allocations. The USAID will also be using more of their available funds in this area, as there are many crops that are native to Liberia which have not been developed to any degree for commercial exportation. These include: copra, citrus fruits, bananas, and pineapple. The palm oil industry now has two large facilities in operation, and President Tolbert has indicated his desire for Liberia to be self-sufficient in rice production by 1980.

Construction: About a 9% yearly increase in the construction of commercial buildings continues in Monrovia. This increase reflects the government's open door policy to stimulate private investment. Additional office space is the primary result of this new construction, placing additional demands for business telecommunications. Residential construction in the Sinkor and Paynesville communities is substantial, as more families are relocating to Monrovia's suburbs. The adjacent Bushrod Island is and will probably continue to be primarily a business and industrial suburb. It is apparent that the kind of developments under way cannot fully succeed without modern telecommunications to serve the area.

Commercial Sector: There has been a gradual growth in this facet of the economy in direct proportion to the increasing

population. As income becomes more evenly distributed, this sector will provide one of the major areas for increased requirements for telecommunication services.

Projections of increased traffic, both domestic and international, are found in Annexes C and D, and indicate the substantial increased demand which will result from more reliable service and increased economic activity. In summary, Liberia has stable political climate and prospects for continued improvement in the economy appears favorable. International price levels have depressed some basic commodity production areas; however, as world prices improve, so will those sectors of the Liberian economy. Total exports are expected to grow at about 5.5%, which is less than imports, however Liberia's improved domestic and external financing position has increased its credit worthiness. The telecommunications expansion project will directly assist Liberia in achieving economic gains which should be realized as a result of increased production and the improved developmental plans and procedures now being implemented.

C. Internal Rate of Return

Ordinarily in analyzing revenue-producing projects being considered for A.T.D. financing, it is desirable to examine whether the national economic profitability will differ from the proposed project's financial profitability. This is analyzed by estimating the indirect economic effects of the project which are, in many cases, more important than the direct commercial profitability of the project. However, in order to apply the techniques to acquire this information, extensive investigations are needed, and in the many cases such calculations are only tentative estimates. Due to insufficient traffic data from previous years, GT&E could not complete this type of detailed analysis. Forecasted traffic and the associated growth in the country's economy are estimated from statistics researched and developed since January 1972, and are felt by the Consultant to be conservative estimates. Through records now being kept, accurate data will be available by the end of CY 73 which will be used in developing meaningful projections of the indirect economic benefits of the project.

In calculating the Internal Rate of Return for the proposed project a modified formula has been used which compares discounted future benefits generated by the system's total expansion to discounted initial and future expenses for plant investment and recurrent operating costs. Using this method, GT&E has calculated the IRR at 15.5% (See Annex II). This rate is acceptable, particularly in view of the fact that by 1992, the LTA, through internal financing, will expand total plant by five times its 1976 capacity.

IV. FINANCIAL ANALYSIS

A. Financial Condition of the Telecommunications Division

1. Background

From the installation of the telecommunications network in 1965 until January, 1972 the Government operated the system. During this period no systematic financial reporting procedure was instituted, bill collection procedures were ineffective, costs for maintaining the system rapidly increased, and through Government hiring policies the annual payroll consumed about 80% of revenues. Since the LTA was part of the Postal Department and was subsidized by the Government, Government departments and agencies enjoyed telephone service without cost. Therefore, the LTA did not maintain the detailed records necessary to determine the cost of services each agency or department received.

Billing for resident customer accounts was done manually and on a very haphazard basis, with a result that customers tended to disregard all billings as inaccurate and subject to protest. GT&E estimates that during this period approximately 50% of bills issued were not collected. Inaccurate customer accounts were maintained, and in some cases customers have never been billed for international toll charges.

Until June, 1972 the same monthly rate for telephone service was charged at \$7.00 per month, with the first 100 calls included in the basic monthly charge. Higher rates for business accounts were not established which resulted in the lower users (resident customers) subsidizing the higher users (business and government).

No general ledger book was maintained by the LTA while it was a part of and responsible to the Government. Thus, only a minimal amount of cost and revenue data and statistics concerning capital expenditures were available to the GT&E management team when they arrived in February, 1972.

2. Reorganization and Progress of the LTA

With the limited information available for analysis, GT&E immediately reviewed the original cost of equipment installed to establish the net plant value in relation to the remaining useful life of property. These fixed assets in addition to the estimated current assets were compared with the LTA's liabilities (Annex G). Liabilities were also only estimated since it was

difficult to determine the LTA's obligations without a general ledger having been maintained.

GT&E used the forecasted 1972 balance sheet as a starting point for subjective estimates about future operations. It was obvious that even with a subsidy the Authority had, while being a part of the Government, operated at a deficit and with this all available sources of funds had been committed to operating capital to meet current expenses (mostly payroll).

To transform the LTA into an efficient and profitable unit, GT&E has instituted a wide range of managerial changes during the past year. The organizational structure was changed to establish direct lines of supervision with defined responsibilities, and the following specific policy decisions were made to improve the LTA's financial position.

a) A 30% forced reduction in employment was made. This has decreased employment from 545 to about 390, and reduced annual payroll from \$720,000 to approximately \$575,000.

In 1972, interim
b) / rates were established at \$9.00 per month for resident telephones and \$15.00 per month for business and government telephones. With this change revenues from the present system should increase by approximately \$125,000 per year. GT&E views this is an interim increase. This would bring Liberia's rate structure more into line with the other West African countries. However, since the decision has not been finalized by the PUA Board of Directors all financial forecasts are based on the interim rate (see Annex F).

c) The Commercial Department was reorganized in February 1972. New billing procedures were implemented, and new ledgers established for a concentrated and extensive collection program. In July and December the Government was billed. The total due for these two periods was about \$250,000 and payment was made on a timely basis.

d) The Accounting Department was reorganized. Financial reporting procedures were introduced to assure the availability of accurate revenue, cost, and accounts receivable information for future budgeting and planning.

3. Proposed Internal Financial Plan

Using the accounting and reporting information being produced as a result of the LTA's reorganization, GT&E has prepared the estimated 20 year Financial Statement found in Annex G. Although the AID loan finances initial expansion, this financial plan is

designed so that future expansion of the plant past 1977 can be accomplished through internal financing. This will permit the LTA to expand at the scheduled growth rate without being dependent on lending institutions.

It is expected that through continued refinement of bill collection procedures (to be ultimately computerized) that uncollectible accounts will fall to no more than 8 to 10% of revenues in 1973. Improved purchasing practices requiring quotes from more than one firm should save 10-15% in the cost of commodities purchased. The financing of a maintenance contract by the LTA and the extension of the GT&E contract or award of a similar contract to provide maintenance training should keep maintenance expenses at a lower level in relation to the system's expansion and increased revenues.

GT&E's forecasted financial plan projects sufficient net income to finance the system's next/major expansion during 1979-1981. This planned expansion will include 5,500 new lines for the Monrovia area, and 900 additional up-country lines. From 1982 to 1992 cash flow increases from \$400,000 to \$600,000 per year are forecast which will be used in part for increased expenses and to satisfy debt servicing of the AID loan. GT&E feels that the LTA will become a financially strong organization particularly since, through internal financing of future expansion, it will be able to avoid long term debt financing which would carry a high interest rate.

More important when justifying the proposed AID funded expansion as a financial investment, one must continue to study the economic benefits to be derived by the economy from a reliable telecommunications system. This is an especially important aspect in Liberia. The LTA plans to subsidize unprofitable up-country locations where they do not seriously impair the operations in profitable locations. This decision has an impact upon the rate of return. However, the ability of the LTA to earn a satisfactory profit will not be seriously impaired when considering the social and economic benefits to be ultimately derived in the rural areas.

B. Financial Requirements

The financial requirements for the proposed project are as follows (see Annex E for details):

	<u>Foreign Exchange</u>	<u>Local Costs</u>	<u>Total Costs</u>
Central Office Equipment (includes Monrovia-Harper link)	\$ 3,604,000	\$504,000	\$ 4,108,000
Buildings, Vehicles, Tools	192,000	222,000	414,000
Outside Plant	1,810,000	225,000	2,035,000
Management and Training Contract	1,627,000	373,000	2,000,000
Maintenance and Rehabilitation Contract	1,103,000	40,000	1,143,000
Engineering Design and Super- vision	800,000	-	800,000
Total	\$ 9,136,000	\$1,364,000	\$10,500,000

C. Financial Plan

The AID loan will provide the foreign exchange funding of specified technical assistance personnel, the procurement of US equipment and approximately \$467,000 in local currency costs associated with these items. The PUA will be responsible for all other local currency and foreign exchange costs necessary to complete the project. In addition, the PUA will be responsible for providing personnel to be trained. The proposed financial plan for the project is as follows:

	<u>US Costs</u>	<u>Local Costs</u>	<u>Total Costs</u>
AID loan	\$8,033,000	\$ 467,000	\$ 8,500,000
GOL Contribution	1,103,000	897,000	2,000,000
Total	\$9,136,000	\$1,364,000	\$10,500,000

D. Other Sources of Financing

AID assistance to the GOL in improving its telecommunications facilities and services began several years ago. In late 1967, the GOL requested donor participation, including AID, in improving the telecommunications facilities. This request resulted in a Telecommunications Survey which AID completed in 1968. Background and technical data furnished by this report led to the decision to grant finance the GT&E management contract for

a period of two years. AID advised the GOL that it would consider a future request to expand the system if the feasibility study required under the GT&E contract produced an acceptable expansion plan. Although this loan falls outside AID's two sectors of concentration in Liberia (Agriculture and Public Administration), it will provide indirect benefits to these sectors and complete AID's commitment to assist the LTA.

E. Economic and Financial Status of the GOL and Repayment Prospects

Liberia's GDP at current market prices rose to \$437.7 million in 1971 from \$417.5 million in 1970, a 4.8% increase, compared with a 7.0% average increase during 1967-70 period. While no reliable official deflators are available for Liberia, if the increase in GDP is discounted at a modest 3-4% for inflation*, there was little growth in real GDP from 1970 to 1971. Thus, given an estimated 3% increase population, Liberia may have suffered a slight drop in real per capita GDP during the period.

A combination of relatively low iron and rubber prices (which together account for approximately 86% of Liberia's merchandise exports); the decision by a group of Japanese businessmen not to invest this year in the \$500-600 Wologisi iron mining project; the phasing down of oil exploration activities; and some investor uncertainty about the implications of early GOL economic policy pronouncements account in large measure for the relatively modest rise in GDP.

Foreign trade is the foundation of the Liberian economy, with exports accounting for 51% of GDP in 1970 and 1971. On exports of \$224 million and imports of \$162.4 million, Liberia registered a favorable balance of trade of \$61.6 million in 1971. This was slightly below 1970's surplus of \$64 million and well below the \$81.2 million surplus recorded in 1969. It should be noted that these impressive trade surpluses continue to be offset by sizeable outflows of profits and factor payments. The value of exports rose 4.8% from 1970 to 1971. Imports, however, climbed 8.2% during the same periods. The pattern of a faster rate of growth in the value of imports over exports appears likely to continue over the next several years and demonstrates Liberia's need for export diversification and import substitution.

* The official price index for Monrovia increased 7.3% for the first 8 months of 1972.

The contribution of the non-enclave sectors of the economy to GDP has remained substantially unchanged for the past several years. Public capital formation continues to be dominated by infrastructure projects, such as roads, communications and power, with investment in agriculture constituting only 3% of the total. Thus development outside the enclave sectors continues to lag, with the result that significant progress toward diffusing economic growth and development remains a goal and not a reality. This situation results from the present lack of agriculture sector projects and is expected to change in the near future when the results of the IBRD-financed rural development studies become available.

Debt service payments continue to absorb about 25% of current revenues, placing a heavy strain on government finances.

External debt servicing outlays (principle and interest) during the past five years, and projected through 1980, are shown in the table below in relation to actual and projected export earnings. In projecting the debt service burden, it is assumed that new debt will have the same terms as have characterized loan commitments to Liberia including a minimum grace period of seven years. Export growth, projected at 5.5 percent is based on data presented in the most recent (1971) IBRD report on "The Current Economic Position and Prospects of Liberia."

Liberia's Debt Service Burden
(US \$ million)

Year	<u>Debt Service (Principal & Interest)</u>	<u>Actual Export of Goods and Services</u>	<u>Ratio of Debt Services to Export of Goods and Services</u>
1967	9.9	158.8	6.2
1968	13.4	169.0	7.9
1969	17.9	195.9	9.1
1970	15.4	213.7	7.2
1971	17.2	224.0	7.7
	<u>Projected</u>	<u>Projected</u>	
1972	16.9	236.3	7.1
1973	18.0	249.3	7.2
1974	20.8	263.0	7.9
1975	19.5	277.4	7.0
1976	19.1	292.7	6.5
1977	19.4	308.8	6.2

Under these assumptions, the debt service ratio (ratio of debt service to export of goods and services) is projected to remain stable through 1975, at 7% after which it will begin to decline through the late 1970's to approximately 4%. This declining debt service ratio is based on the assumption that the GOL's policy of reducing reliance on short-maturity, hard-term supplier's credit will continue.* Thus, for the foreseeable future, Liberia's debt ratio does not represent a constraint to contracting further debt. However, with the financial situation of the public sector being the main constraint, continued caution must be exercised in contracting new conventional debt.

The Liberian economy is basically sound and the general outlook over the longer term is favorable. Substantial increases in forest production are expected over the next several years and earnings therefrom should show a quantum jump in 1974 with the opening of the \$19 million plywood factory.

Continued increases in rubber production and total value are also expected although rubber prices have been somewhat unstable. Further, possibilities exist for expansion and upgrading of iron ore production. Thus, assuming that a substantial portion of Liberia's external financing is obtained on concessionary terms, and improvements continue in tax administration and control of the annual budget, the prospects for Liberia repaying the loan are reasonable.

V. IMPACT OF LOAN ON US ECONOMY

The loan will have a favorable impact on the US economy. Of the total loan of \$8.5 million approximately \$8.0 million will be used for the purchase of equipment manufactured in the U.S. and for the employment of U.S. technical personnel to design and help construct the facilities. In addition, there will be secondary benefits as a result of the continued purchase of spare parts for the equipment. Although AID will finance a small proportion of local costs of the project, this should be more than counter-balanced by future importation of replacement parts from the U.S. Even though Code 941 procurement will be allowed, we believe U.S. firms will be the only competitive bidders able to meet the specifications on the types of equipment and services needed.

VI. CONDITIONS AND COVENANTS

The Loan Agreement will contain three tiers of Conditions Precedent to Disbursement. These Conditions will require the Borrower to award all contracts on a timely basis to assure completion of all equipment installation and the training of Liberian personnel to maintain the expanded system. Initial disbursement of loan funds will require a) execution of the GT&E contract amendment or award of another contract to provide

* Between 1964 and 1969, these loans were reduced from 33% of external, public debt outstanding to 22%.

continued management and training assistance, and b) execution of the LTA financed contract for maintenance and rehabilitation. Second tranche disbursement of loan funds will require the award of the contract for engineering design and supervision. The final tranche of loan funds will be made available upon the execution of contracts for construction and equipment supply.

The Loan Agreement will contain a covenant that the PUA will provide on a scheduled basis the construction of buildings to house the new equipment, site preparation, and any necessary access roads. The construction contract(s) will contain a requirement for maintenance and operations training for a one year period after installation. Another covenant contained in the Loan Agreement will require the PUA to provide qualified personnel to be trained by the technical assistance personnel provided under the construction contracts. A third covenant will require the PUA to finance the services of a consultant to supervise the removal of the L.M. Ericsson equipment from the Monrovia Central Office and its reinstallation in the Monrovia/Sinkor Branch Office.

VII. ENVIRONMENTAL IMPACT

There should be no significant environmental impact resulting from the implementation of the proposed project. Except for buildings and antennas of the coastal troposcatter stations at Buchanan, Greenville and Harper the existing buildings which require revisions are within the limits of municipal areas and any changes must meet the requirements of the local building codes. Any microwave towers which may have to be replaced will generally be of the same heights as the existing towers and installed on the same sites. In fact, since the new towers are of improved design they will, in general, tend to look better than the existing bulkier and less elegantly designed structures. As for the troposcatter buildings and antennas, proper design will be required of the engineer to ensure that they are not unsightly and do not constitute a scenic blight. Since the system produces no atmospheric effluents, does not require cooling water, and generates no audible noise, it can have no injurious environmental effects.

VIII. IMPLEMENTATION PLAN

The following schedule states intervals beginning with the date of signature of the Loan Agreement

	<u>Month</u>
Sign Loan Agreement	0
Execute extension of GT&E Management Contract	1
Execute Maintenance Contract	2
Conditions Precedent to Initial Disbursement	3
Prequalify Engineering Consultants	3
Receive engineering proposal	5

Award engineering contract	7
Conditions Precedent to Second Tranche Disbursement	7
Complete engineering design and bid specifications	12
Prequalify construction bidders	12
Open bids for construction and equipment supply	14
Award all Contracts	16
Conditions Precedent to Third Tranche Disbursement	16
Construction starts on buildings	18
Installation of major equipment starts	20
Project completion	38
End of guarantee and maintenance period	50
Terminal Disbursement Date	56

USAID/Liberia and the Regional Economic Development Services Office in Abidjan will be responsible for monitoring this project, with specific technical advice as required from AED/W.

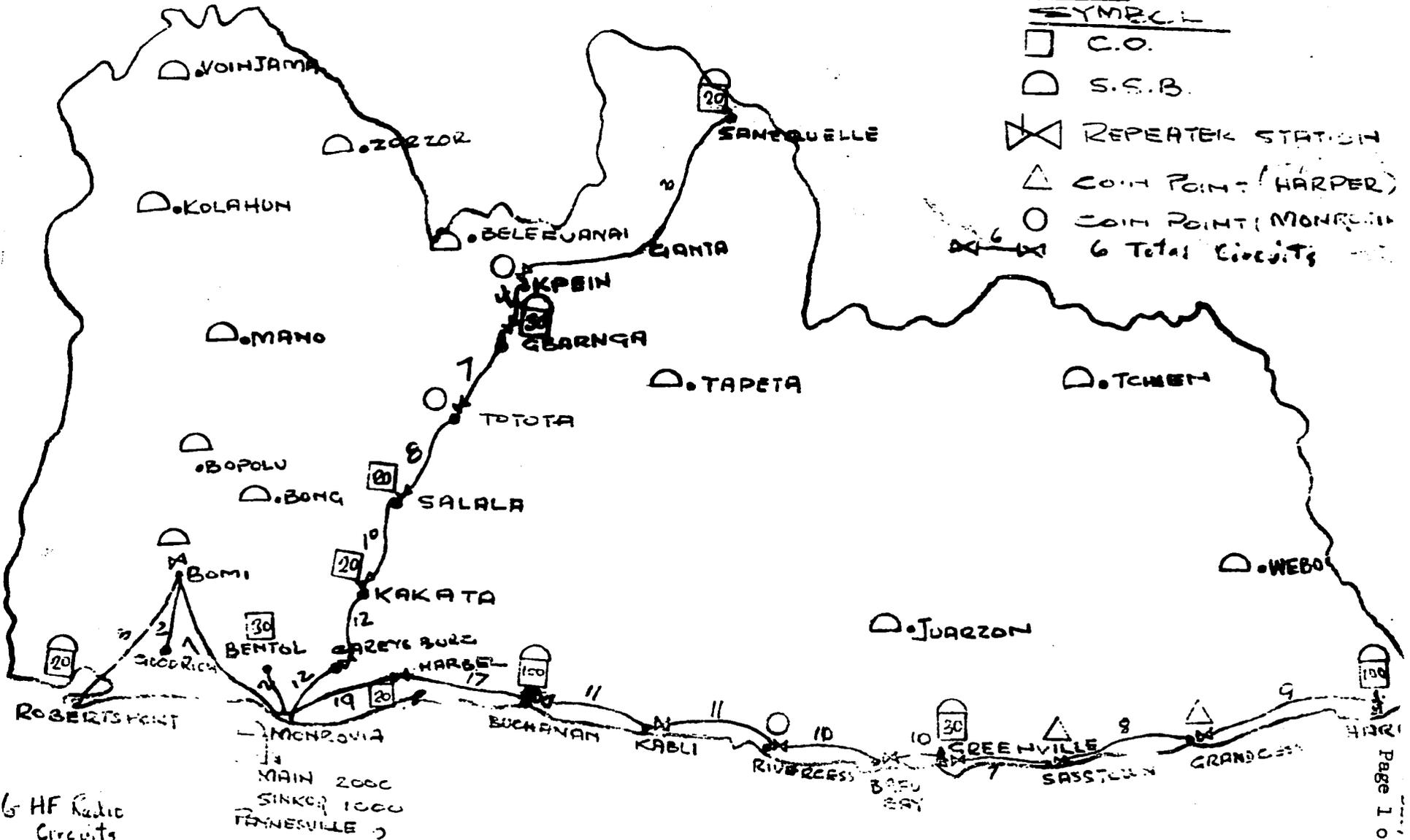
1372

4-16-73

LIBERIA

SYMBOL

- C.O.
- S.S.B.
- ⊗ REPEATER STATION
- △ COIN POINT (HARPER)
- COIN POINT (MONROVIA)
- ⊗ 6 Total Circuits



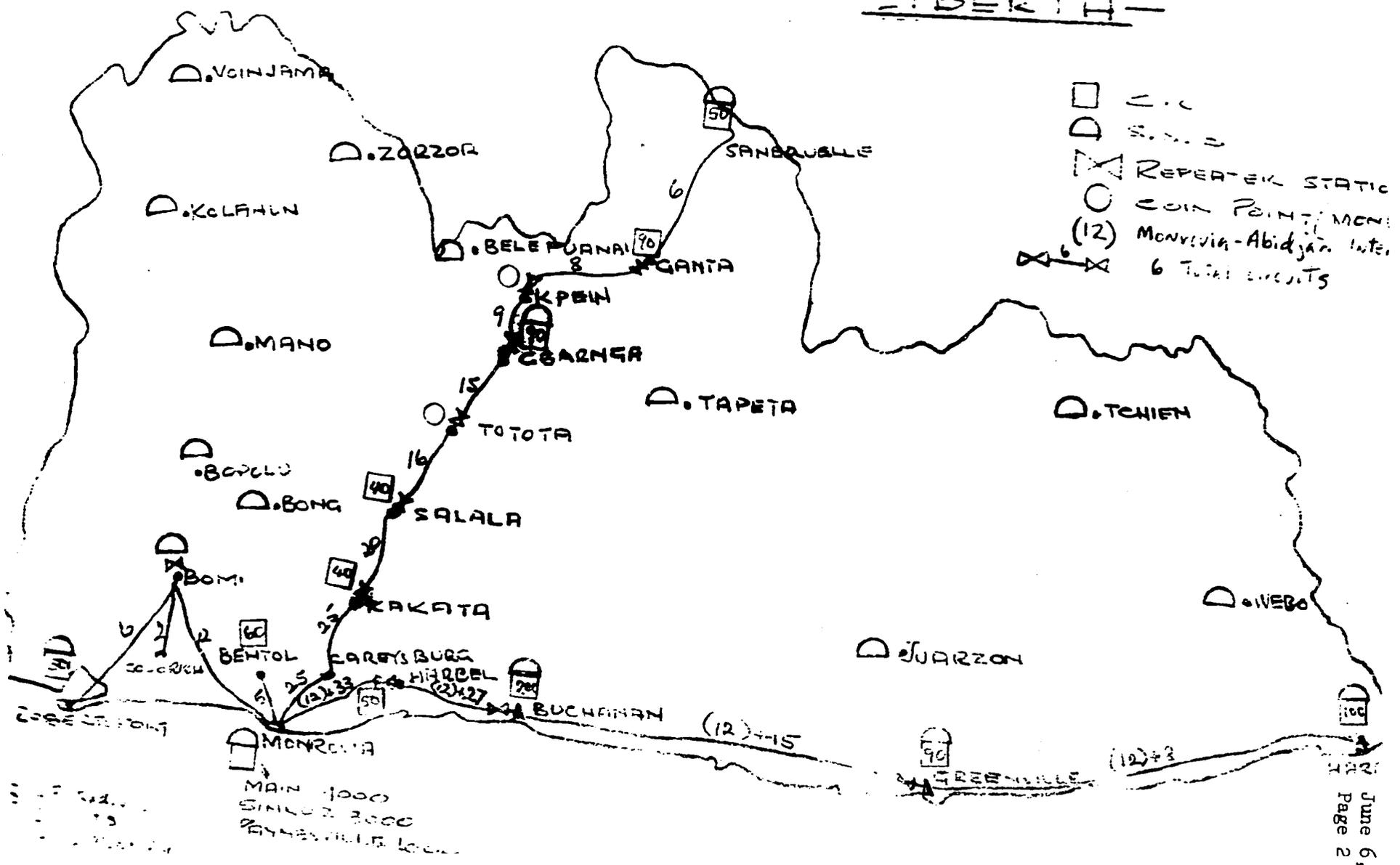
6 HF Radio Circuits from Monrovia

1976

ANNEX 4

FIG. A-2

LIBERIA



LTA MANAGEMENT

June 6, 1973

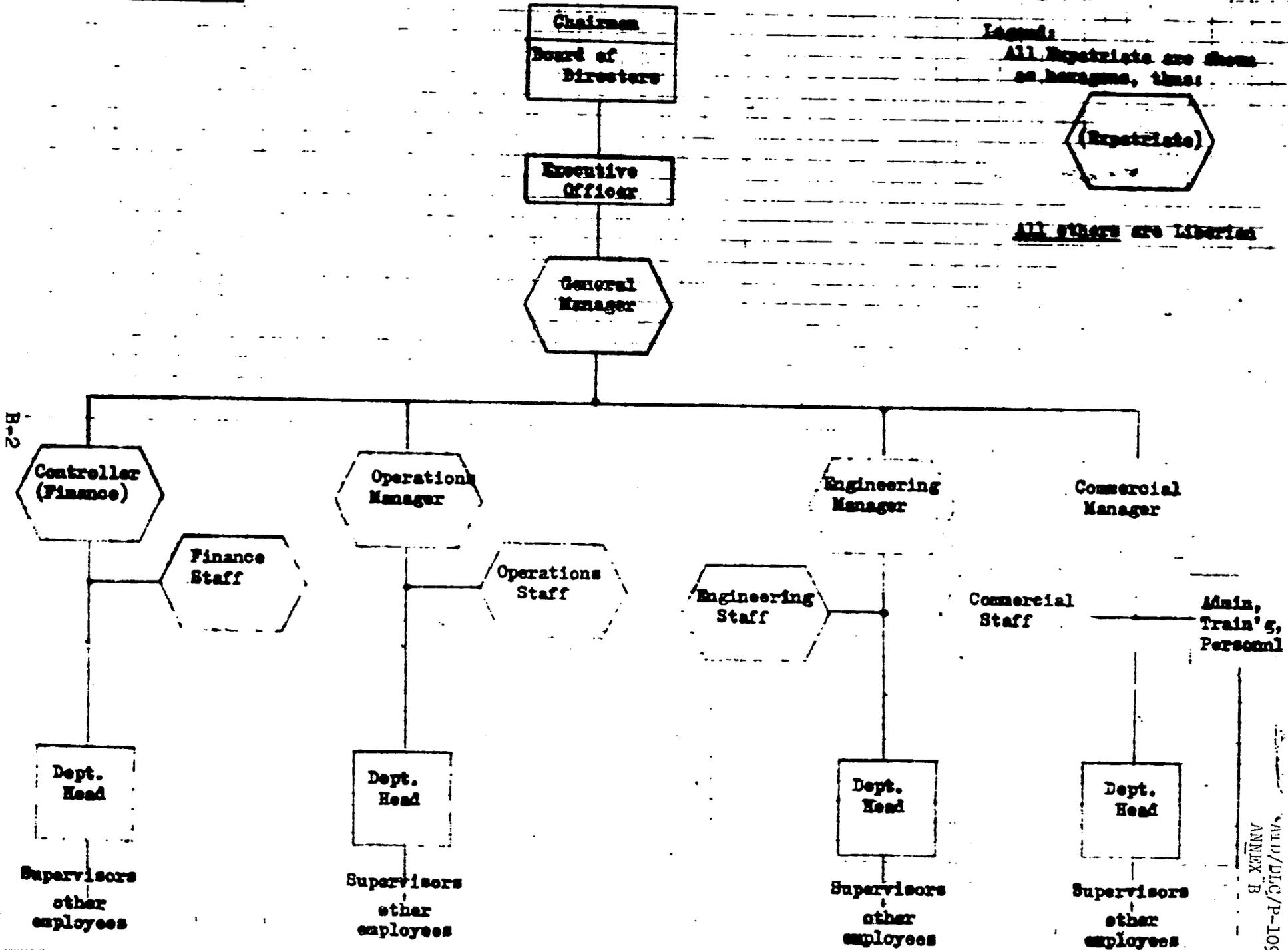
Operation of the LTA is governed by policy originated by the Liberian Government, and interpreted by the Board of Directors. In addition to those policy decisions enunciated at regular meetings of the Board of Directors, the Board Chairman may, from time to time, provide to LTA management personnel additional clarification or interpretation, and resolve other questions that cannot be disposed of at other levels.

The management organization is shown on Chart B-1. In that chart expatriate personnel are identified in hexagonal boxes; all others are Liberian. The fundamental scheme is to unambiguously identify the flow of authority and responsibility, since these must go together to permit effective and meaningful management. The Executive Officer reports to the Board of Directors through the Chairman. The expatriate General Manager reports in turn to the Executive Officer. Department Managers, presently expatriate, report to the General Manager; four Department Managers are shown on the present chart. It may be necessary, at some future time, to consider increasing the number of Department Managers, and/or to realign their areas of authority and responsibility. Reporting to each Department Manager is a Department Head (these individuals are currently designated "Counterparts") who is responsible for direct review and supervision of all other Liberian personnel in the department. Thus, the lines of authority and responsibility are direct and unequivocal.

Each Department Manager has, in addition to those reporting directly to him, a staff of expatriates to aid him, and to support and advise line personnel. The sizes and mixtures of talent and experience in these staffs will be changed from time to time to best suit current and expected needs. In addition to their line management functions, the expatriate personnel collectively provide a staff to the General Manager to assist him as required in conducting studies, formulating plans, and providing recommendations to the Executive Officer. Within the LTA organization, in this manner, expatriate personnel not only assist in direct line management but are also able to function effectively as a team to focus their combined experience upon problems that may arise.

Included in the requirements for effective management is a means of accurately accounting for costs and assigning these to proper categories to permit useful measurements of effectiveness. Additionally, as a result of the very flexible approach to personnel assignments proposed, it is necessary to segregate costs and charges to distinguish those applicable to AID-supplied funds from those applicable to PUA-supplied funds. A cost accounting system to provide for these purposes will be established.

CHART B-1



B-2

LTA MANAGEMENT

June 6, 1973

Operation of the LTA is governed by policy originated by the Liberian Government, and interpreted by the Board of Directors. In addition to those policy decisions enunciated at regular meetings of the Board of Directors, the Board Chairman may, from time to time, provide to LTA management personnel additional clarification or interpretation, and resolve other questions that cannot be disposed of at other levels.

The management organization is shown on Chart B-2. In that chart expatriate personnel are identified in hexagonal boxes; all others are Liberian. The fundamental scheme is to unambiguously identify the flow of authority and responsibility, since these must go together to permit effective and meaningful management. The Executive Officer reports to the Board of Directors through the Chairman. The expatriate General Manager reports in turn to the Executive Officer. Department Managers, presently expatriate, report to the General Manager; four Department Managers are shown on the present chart. It may be necessary, at some future time, to consider increasing the number of Department Managers, and/or to realign their areas of authority and responsibility. Reporting to each Department Manager is a Department Head (these individuals are currently designated "Counterparts") who is responsible for direct review and supervision of all other Liberian personnel in the department. Thus, the lines of authority and responsibility are direct and unequivocal.

Each Department Manager has, in addition to those reporting directly to him, a staff of expatriates to aid him, and to support and advise line personnel. The sizes and mixtures of talent and experience in these staffs will be changed from time to time to best suit current and expected needs. In addition to their line management functions, the expatriate personnel collectively provide a staff to the General Manager to assist him as required in conducting studies, formulating plans, and providing recommendations to the Executive Officer. Within the LTA organization, in this manner, expatriate personnel not only assist in direct line management but are also able to function effectively as a team to focus their combined experience upon problems that may arise.

Included in the requirements for effective management is a means of accurately accounting for costs and assigning these to proper categories to permit useful measurements of effectiveness. Additionally, as a result of the very flexible approach to personnel assignments proposed, it is necessary to segregate costs and charges to distinguish those applicable to AID-supplied funds from those applicable to PUA-supplied funds. A cost accounting system to provide for these purposes will be established.

June 6, 1973

TELEPHONE STATION FORECASTS

The forecasts here are based upon methods described in the ITU publication "Economic Studies at the National Level in the Field of Telecommunications", Geneva 1 July 1, 1968, chapters II and III. In sum, the method attempts to relate economic indicators such as Gross National Product or Gross Domestic Product to the number of telephone stations that may be expected to be needed and used by the nation's inhabitants. In particular, the Gross Domestic Product per Capita is used as a measure of the expected demand for telephone stations in terms of station density, i.e., telephone stations per hundred persons. The correlation between GDP/Capita and station density is highly variable with location (country), time period (condition of national and world economics, national degree of industrialization and urbanization), national or regional habits and customs of telephone usage, and other objective and subjective factors. However, there are general guidelines applicable to newly developed countries; these were, in the present instance, adjusted by judgment and knowledge of Liberian national and local goals and conditions and used as a partial basis of estimate.

Estimates of Liberia's GDP/Capita and its probable growth for the next twenty years vary widely from source to source. Data from PUA and GOL sources, based mostly on hindcasts of the mid- to late-1960's, indicated the 1972 GDP/Capita to be around \$340-\$350 with a current growth rate of 3.2 to 3.9% annually. Other sources indicate somewhat lower values; the most recent estimates from the U.S. Department of State (USSD), based upon 1970-1972 data furnished by the U.S. Embassy in Liberia assert the 1972 GDP/Capita is \$280 and its annual growth rate is 1.9% (these figures from U.S. Department of Commerce "Foreign Economic Trends", Pub. No. ET 72-136, dated 12/12/72). For this forecast a value of \$280 for Liberia's 1972 GDP/Capita was used, and an annual growth value of 1.8% (rather than 1.9%) is more suitable for telephone planning purposes, to account for some expected effects of current foreign exchange conditions. This results in the following projection:

<u>Year</u>	<u>GDP/Cap.</u>	<u>Year</u>	<u>GDP/Cap.</u>
1972	280	1978	312
1973	285	1979	317
1974	290	1980	323
1975	295	1981	329
1976	301	1982	335
1977	306	1983	341

<u>Year</u>	<u>GDP/Cap.</u>	<u>Year</u>	<u>GDP/Cap.</u>
1984	347	1989	379
1985	353	1990	386
1986	359	1991	393
1987	366	1992	400
1988	372		

Population figures for Liberia are generally based upon a census conducted in the 1960's, and estimates of present population and growth rates vary from source to source. The Republic of Liberia, Department of Planning and Economic Affairs made data available that is in good agreement with USSD estimates (from ET 72-136), but with a slightly more refined (lower) index. They are based upon an estimated 1970 total population of 1,523,000 and an annual growth rate of 3%. These latter data are used in the present projections. The Department of Planning and Economic Affairs ("DPEA") data are reproduced as Tables C-1 and C-2.

In the present state of the Liberian economy, it is not meaningful to make projections and forecasts of telephone usage based upon total population figures since a large percentage of Liberians conduct their affairs largely outside the economic and social institutions that encourage significant (from a planning viewpoint) use of the telephone system. PUA utilizes an explicit, though arbitrary, definition of what may be termed "urban" population: those customarily residing in cities or towns of 2000 or more persons. This "urban" population was used as a basis for the forecasts. Individuals in DPEA assert that, for the foreseeable future, Liberia's rural-to-urban migration rate will be between 7% and 10%, and that this, combined with the somewhat lower urban mortality rates, especially for infants, will result in "urban" growth rates in excess of 10%/year well past 1990. This postulate was not accepted since it would require the "urban" population to exceed the total population before 1992. The most conservative estimate of urban population growth (3%), on the other hand, is clearly not applicable (at least at the present time) for Monrovia and its environs. Energetic attempts to secure useful population and growth estimates for population centers presently served by LTA exchanges, or for county-by-county total population figures (current or historical) did not result in useful data. Accordingly, an urban growth rate for planning purposes of 7%/year was selected as a plausible value, at least for the next ten years. The planned station growth rate has been reduced in 1982 to reflect the uncertainties in urban population growth.

The Annex to Chapter III of the above-mentioned ITU document provides a number of curves or graphs relating GDP to Telephone

Station Density for thirty nations in the period 1955-1965. "Graph 10" of this group, which is CCITT-2205, is a reasonable approximation of the situation expected to obtain in "urban" Liberia in the 1970's and 1980's and it was used, combined with the GDP indices described above, to generate demand forecasts of station density and total stations. The forecasts, for two rates of economic growth (3% and 1.8% annual increase in GDP/capita) are tabulated in Table C-3.

A conservative approach in station forecast was taken for the purposes of this plan. Not only was a reduced growth rate used after 1982 (as noted above), but the growth was also stated from a lower base than would be indicated by the ITU-method forecast. The principal reason for this lower base is the requirement that the initial growth is to be centered in the Monrovia-Bushrod-Paynesville-Sinkor region in order to accomplish the plant structure and connectivity necessary for rational growth to other regions of Liberia, and to achieve the financial basis necessary to generate funds for all expansion and growth after the initial increments of the plan. The resultant station density is somewhat higher, in the Monrovia region, than would immediately be necessary otherwise, hence the lower overall initial base.

TABLE C-1: CPEA 1973 ESTIMATES OF GDP

PER CAPITA GROSS DOMESTIC PRODUCT
AT MARKET PRICES, 1971 - 1973

<u>Year</u>	<u>G.D.P. Million Dollars</u>	<u>Estimated Population (Millions)</u>	<u>Per Capita G.D.P. (Dollars)</u>
1971	449.1	1.57	286.0
1972)*	478.0	1.62	295.0
1973)*	508.5	1.67	304.4

* Figures for 1972 and 1973 are estimates.
Annual increase in G.D.P. - 6.4%.
Annual increase in population - 3.0%.

TABLE C-2: DPEA ESTIMATES OF POPULATION (1973)

POPULATIONS ESTIMATES - 1972 - 1990

<u>Year</u>	<u>Population @ 3% Growth Rate</u>
1972	1,618,621
1973	1,665,766
1974	1,712,910
1975	1,760,054
1976	1,807,199
1977	1,854,343
1978	1,901,487
1979	1,964,346
1980	2,027,205
1981	2,090,064
1982	2,152,923
1983	2,215,783
1984	2,278,642
1985	2,341,501
1986	2,404,360
1987	2,482,934
1988	2,561,508
1989	2,640,081
1990	2,718,655
1991	2,800,200
1992	2,884,200

TABLE C-3

TELEPHONE STATION DEMAND FORECAST

YEAR	"URBAN POPULATION (NOTE 1)	" 3% " DENSITY: STATIONS PER 100 PERSONS (NOTES 2, 3)	STATIONS REQUIRED (TO ACHIEVE "3%" DENSITY)	" 1.8% " DENSITY: STATIONS PER 100 PERSONS (NOTES 2, 4)	STATIONS REQUIRED (TO ACHIEVE "1.8%" DENSITY)
1970	382,000	2.0-2.8	7,600-10,700	2.0-2.8	7,600-10,700
1971	409,000	↓	8,200-11,500	↓	8,200-11,500
1972	438,000		8,800-12,300		8,800-12,300
1973	468,000	2.3-3.2	10,800-15,000	↓	9,400-13,100
1974	501,000	↓	11,500-16,000	↓	10,000-14,000
1975	536,000	↓	12,300-17,200	2.3-3.2	12,300-17,200
1976	573,000	↓	13,200-18,300	↓	13,200-18,300
1977	613,000		14,100-19,600		14,100-19,600
1978	656,000	3.0-4.0	19,700-26,200	↓	15,100-21,000
1979	702,000	↓	21,100-28,100	↓	16,100-22,500
1980	751,000	↓	22,500-30,000	↓	17,300-24,000
1981	804,000		24,100-32,200		18,500-25,800
1982	860,000	3.5-4.7	30,100-40,400	↓	19,800-27,600
1983	921,000	↓	32,200-43,300	↓	21,200-29,500
1984	985,000	↓	34,500-46,300	3.0-4.0	29,600-39,400
1985	1,054,000	↓	36,900-49,500	↓	31,600-42,200
1986	1,128,000	4.2-6.0	47,400-67,700	↓	33,800-45,100
1987	1,207,000	↓	50,700-72,400	↓	36,300-48,300
1988	1,291,000	↓	54,200-77,500	↓	38,700-51,600
1989	1,382,000		55,000-82,900	↓	41,500-55,300
1990	1,478,000	4.7-6.6	69,500-97,500	↓	44,300-59,100
1991	1,582,000	↓	74,400-104,400	3.5-4.8	55,400-75,900
1992	1,693,000	↓	79,600-111,700	↓	59,200-81,300

Notes:

1. "Urban" population resides in communities of 2000 or more persons. Values are derived from Government of Liberia data (Department of Planning and Economic Affairs) and are based upon overall population growth rate 3% and Rural-to-Urban migration rate of 7% (modified from Government of Liberia data).
2. Telephone Station Densities are derived from ITU/CCITT 2205 for developing countries, based on projected Gross Domestic Product per Capita.
3. Growth rate derived from Government of Liberia data (Department of Planning and Economic Affairs) for 1969 - 1970, and is based on a 3% rate of increase in Gross Domestic Product per Capita.
4. Growth rate derived from U.S. State Department estimates ("Economic Trends", BT 72-136, November 1972, American Embassy, Monrovia) for 1971-1972, and is based on a 1.8% rate of increase in Gross Domestic Product per Capita.

TRAFFIC FORECASTS

This Annex contains four separate sections: "Local" (intra-Liberian) telephone traffic forecasts; international telephone traffic forecast; total (combined local and international); Telex traffic forecasts; and total (essentially international) Telegraph traffic forecasts. Each of these is discussed separately.

1) Intra-Liberian Telephone Traffic -- Two fundamental collections of data are the basis of estimate of these forecasts: the station forecast of Annex C, and actual operating experience in late 1972 and early 1973. Visual observations were made at Monrovia (main) and, to a lesser extent, at Sinkor. The main equipment configuration limits the exchange to 1.69 hundred call seconds per station (ccs/station) originating and 1.51 ccs/station terminating (combined two-way 3.20 ccs/station). The visual observation resulted in an estimated (during the busy hour) 2.84 ccs/station originating and 3.35 ccs/station terminating, or a combined demand of 6.19 ccs/station. See Figure D-1, "Traffic Intensity" for visual count results and Figure D-2, "Traffic Capacity" for equipment capability (the main office is a "6A" configuration). Each other facility has intrinsic trunking capability as a percentage of total line capacity. This percentage, in conjunction with the estimated value of three minutes per call on the average, is used to develop busy-hour calls in each exchange. Observations of trunk usage, modified by judgmental factors of an experienced traffic engineer, were used to generate estimated busy hour ccs/station factors for each exchange. Ratios between residence, business, and Government services current in Monrovia are extrapolated to all other exchanges. Yearly facility busy-hour traffic projections, to 1992, are generated from this base, and are shown in Table D-1. These data are then summarized by service type and year in Table D-2. The totals of Table D-2 (Total Stations, Total Calls, and Total Minutes) include the 1120 (Current quantity) so-called "private" stations not now directly served by LTA. It is estimated that by 1979 the LTA size and capability will have grown to the point that private exchange owners or users will wish to be interconnected to and directly serviced by LTA. The effects of National Toll-rate considerations have been included in the traffic estimates and forecasts. The traffic projected and forecasted here will in fact result from the proposed system expansion with present National toll-rates. It is normal Telephone Company procedure in the USA to continuously or frequently study and review rates and toll charges, and such procedure is

recommended to LTA. However, there is no necessity for rate and toll-charge reviews during the period of the proposed AID-loan funded expansion.

2) International Telephone Traffic -- The basis of estimate used for this projection is actual (reconstructed) two-way traffic for 1972 and January-February 1973. These two are combined to provide an artificial, but judged accurate and suitable, base for projection. Reliable estimates of growth rates for this traffic could not be found in the literature. Estimates by Page (1969), CCITT (1967 - Pan African Conference), France Cables and Radio (FCR) (1973) and Sofrecom/ITU (1973) were examined. Although these estimates vary widely, a least-squares consensus indicates an annual growth rate of about 19-22%. This was reduced to 18% for PUA's purposes, and to further modify it to show a steeper slope 1972-1979, a fairly flat slope 1980-1986, and a markedly shallower slope 1987-1992 when plotted on semi-logarithmic paper. These adjustments represent the best judgment on the expected actual pattern of traffic and are in accordance with the general principles laid down by ITU. A similar process is used to generate forecasts of European traffic (two-way) and U.S.A. (i.e., North America) traffic. This breakdown is sufficiently fine for the present purposes, since it will result in a more conservative revenue forecast than one accounting piece-by-piece for all countries or continents. See Figure D-3. It will be noted that after 1980, U.S.A. traffic continues to increase at a constant rate, since this segment of international traffic will not start appreciably leveling until the mid-to-late 1990's.

3) International Telex Traffic -- As with telephone traffic, 1972-1973 experience is used as a base for projection. Actual two-way Telex traffic in 1972, based upon incomplete records, was about 115,000 paid minutes. January and February 1973 data indicate that a corrected value of 117,500 paid minutes is a more plausible base for projection, through probably somewhat conservative and thus suitable for the PUA's purposes. A growth rate slightly less than that for U.S.A. telephone traffic, based on scattered records from 1971, 1969, and 1968, suggest growth rates on the order of 25-35%. Based upon a rather arbitrary assessment, an annual growth rate of 17% was used. No satisfactory basis was found for modifying the slope of the projected growth curve, which is shown in Figure D-4.

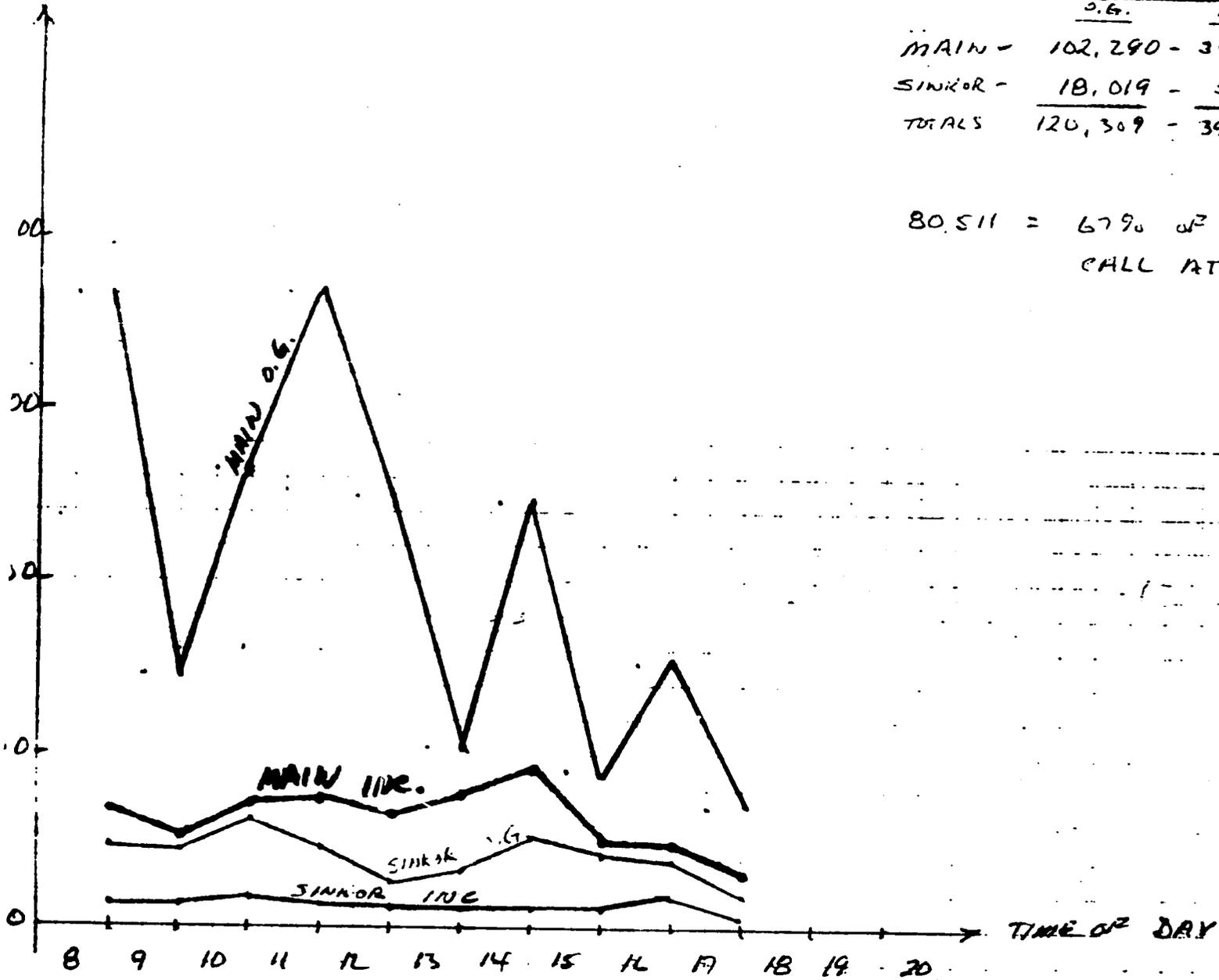
4) International Telegraph Traffic -- A process identical to that for Telex is used to forecast two-way international telegraph traffic. The growth rate is very small - about 2% on the average. Minor slope adjustments are made in 1972-1974 to account for increased usage while international telephone service is being improved, and a slight step is

added in 1982 to reflect increased traffic resulting from the expectation of increased commercial intercourse between Liberia and the Far East starting around 1980. This figure is also shown in Figure D-4.

Table D-3 shows tabulated values for International Telephone, Telex, and Telegraph traffic forecasts. No attempts were made to forecast local (i.e., intra-Liberian) Telex and Telegraph traffic since they are considered essentially irrelevant to the purposes of these forecasts and estimates.

For comparison purposes, Tables D-4(a) and D-4(b), abstracts of traffic projections made by Sofrecom for ITU and by FCR for GOL, have been included. The documents from which these were abstracted are dated March and February, 1973, and are therefore current estimates. The GTE projections fall between them, which gives additional confidence in their estimating technique.

ATTEMPTS



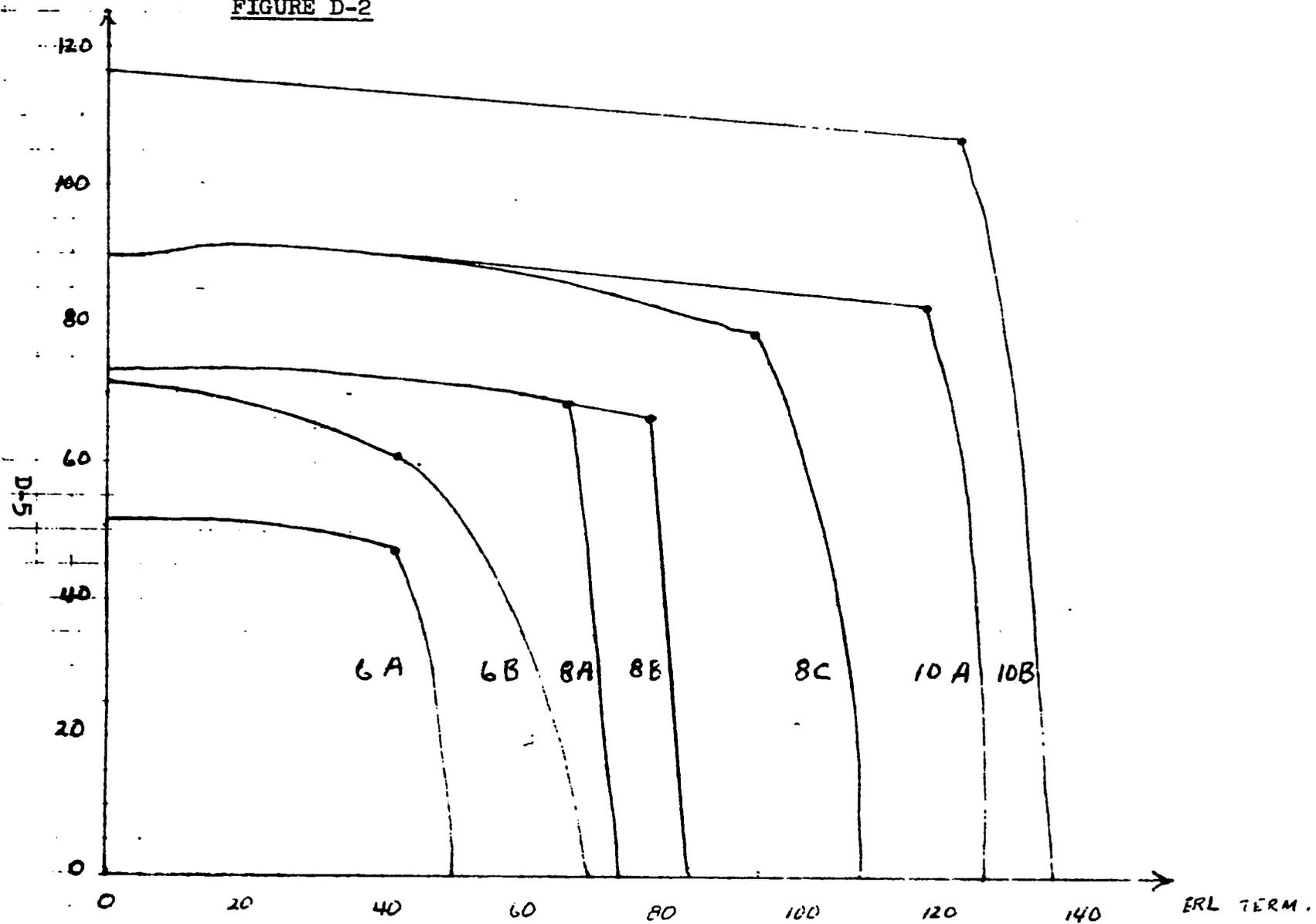
TOTAL ATTEMPTS

	O.G.	INC	
MAIN	102,290	34072	= 68,218
SINKOR	18,019	5726	= 12,293
TOTALS	120,309	39798	= 80,511

80,511 = 67% OF TOTAL ORIG.
CALL ATTEMPTS.

ERL UNIT.

FIGURE D-2



TRAFFIC CAPACITY OF THE VARIOUS SL CONFIGURATIONS.

TABLE D-1
FACILITY BUSY HOUR TRAFFIC

	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
MAIN - STATION	2000	2000	2000	3000	3000	3000	3000	3000	4000	4000	4000
" CCS	5680	5680	5680	8520	8520	8520	8520	8520	11360	11360	11360
STARKER - STATION	1000	1000	1000	2400	2400	3000	4000	4000	4000	4000	4000
" CCS	1700	1700	1700	4080	4080	5100	6800	6800	6800	6800	6800
ROBERTSON STA.	20	20	20	20	50	50	70	80	90	90	90
" CCS	18	18	18	18	45	54	63	72	81	81	81
KAPPAH-STATION	20	20	20	20	40	40	50	60	60	70	90
" CCS	14	24	24	24	28	28	35	42	42	49	63
SARITA - STATION	20	20	20	20	40	40	40	50	50	50	60
" CCS	12	12	12	12	24	24	24	30	30	30	36
GBARNA-STATION	20	20	20	20	50	60	70	90	90	90	90
" CCS	24	24	24	24	60	72	84	108	108	108	108
SANQUELLIE STA.	20	20	20	20	50	60	70	70	70	70	70
" CCS	20	20	20	20	50	60	70	70	70	70	70
HARDEL - STATION	30	30	30	30	50	60	70	80	80	90	90
" CCS	36	36	36	36	50	72	84	96	96	108	108
BENTON - STATION	30	30	30	30	60	60	60	70	70	80	90
" CCS	18	18	18	18	36	36	36	42	42	48	54
HUGHANAN-STATION	100	100	100	100	200	240	270	280	280	290	300
" CCS	120	120	120	120	240	288	324	336	336	348	360
GREENVILLE-STA.	40	40	40	40	90	90	90	120	130	140	150
" CCS	40	40	40	40	90	90	90	120	130	140	150
HARPER - STATION	100	100	100	100	100	100	110	130	140	140	150
" CCS	90	90	90	90	90	90	99	117	126	126	135
MUSKOGEE-STATION	-	-	-	1000	1000	1000	1600	2000	2000	2000	2000
" CCS	-	-	-	1800	1800	1800	2880	3600	3600	3600	3600
LAYNESVILLE-STA.	-	-	-	1000	1000	1000	2000	3000	3000	3000	3000
" CCS	-	-	-	1600	1600	1600	3200	4800	4800	4800	4800
FRIMM - STATION	1120	1120	1120	1120	1170	1220	1270	1320	1370	1420	1460
" CCS	1120	1120	1120	1120	1170	1220	1270	1320	1370	1420	1460
GAITA - STATION	-	-	-	-	100	100	100	100	120	140	200
" CCS	-	-	-	-	100	100	100	100	120	140	200
MOINJANA-STATION	-	-	-	-	50	50	50	50	50	60	70
" CCS	-	-	-	-	40	40	40	40	40	48	96

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TABLE D-1 Cont'd
FACILITY BUSY HOUR TRAFFIC

	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
COMM - STATION	-	-	-	-	50	50	50	50	50	60	70
" CCS	-	-	-	-	35	35	35	35	35	42	49
TELECOM - STATION	-	-	-	-	10	40	40	40	40	40	60
" CCS	-	-	-	-	24	24	24	24	24	24	36
TOTAL COMMUNICATIONS	4520	4520	4520	9490	9630	10360	13100	14680	15780	15920	16040
TOTAL TELECOMS	8892	8892	8892	15130	18070	19172	23680	26272	29123	29342	30018

TABLE D-1 Cont'd
FACILITY BUSY HOUR TRAFFIC

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
MAIN - STATION	4000	4000	4000	5000	5000	5000	5000	5000	6000	6000
" CCS	11360	11360	11360	14200	14200	14200	14200	14200	17040	17040
SINKOR - STATION	4000	4000	4000	5000	5000	5000	5000	5000	6000	6000
" CCS	6800	6800	6800	8500	8500	8500	8500	8500	10200	10200
ROBERTSPORT STA.	100	100	130	130	140	150	160	180	200	200
" CCS	90	90	117	117	126	135	144	162	180	180
KAKATA-STATION	90	90	100	100	110	120	130	150	170	180
" CCS	63	63	70	70	77	84	91	105	119	126
SALALA - STATION	60	60	70	70	80	90	100	110	120	130
" CCS	36	36	42	42	48	53	60	66	72	78
GBARNGA-STATION	90	90	110	130	140	150	160	180	190	200
" CCS	108	108	132	156	168	180	192	216	228	240
SANQUILLIE STA.	70	70	70	70	80	90	100	120	130	140
" CCS	70	70	70	70	80	90	100	120	130	140
HARBEL - STATION	100	100	100	110	120	150	160	170	180	200
" CCS	120	120	120	132	144	180	192	206	216	240
BENTOL - STATION	100	120	120	130	140	150	160	160	170	170
" CCS	60	72	72	78	84	90	96	96	102	102
BUCHANAN-STATION	340	380	380	470	480	500	520	530	560	600
" CCS	408	456	456	564	576	600	624	636	672	720
GREENVILLE-STA.	190	210	240	270	280	300	340	370	380	380
" CCS	190	210	240	270	280	300	340	370	380	380
HARPER - STATION	160	170	200	200	200	200	230	240	260	260
" CCS	144	153	180	180	180	180	207	216	234	234
BUSHROD-STATION	2000	2000	2000	3000	3000	3000	4000	4000	5000	5000
" CCS	3600	3600	3600	5400	5400	5400	7200	7200	9000	9000
PAYNESVILLE-STA.	3000	3000	3000	4000	4000	4000	5000	5000	6000	6000
" CCS	4800	4800	4800	6400	6400	6400	8000	8000	9600	9600
PRIV. - INST. STA.	1560	1660	1750	1880	1990	2100	2210	2330	2450	2600
" CCS	1560	1660	1750	1880	1990	2100	2210	2330	2450	2600
GANTA - STATION	210	220	240	270	280	300	300	300	300	300
" CCS	210	220	240	270	280	300	300	300	300	300
VOINJAMA-STATION	70	70	80	80	80	90	90	90	90	100
" CCS	56	56	64	64	64	72	72	72	72	80

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TABLE D-1 Cont'd

FACILITY BUSY HOUR TRAFFIC

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
TCMIEV - STATION	70	70	80	80	90	90	90	90	90	90
" CCS	49	49	56	56	63	63	63	63	63	63
ZORZOP - STATION	60	60	60	80	80	90	90	90	90	90
" CCS	36	36	36	48	48	54	54	54	54	54
TOTAL STATIONS	16270	16510	16750	21040	21270	21750	23850	24180	28450	28700
TOTAL BH-CCS	29760	29959	30205	38254	38708	38991	42558	42912	51112	51215

TABLE D-2
BUSY HOUR ESTIMATE SUMMARY

	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
GOVERNMENT											
Stations	480	480	480	1159	1204	1280	1525	1650	1835	1880	1920
Calls	340	340	340	1080	1080	1260	1050	1200	1320	1390	1440
Minutes	1246	1246	1246	3079	3676	5513	4341	5258	5824	5868	6004
RESIDENTIAL											
Stations	2564	2564	2564	5818	5889	6400	8501	9748	10243	10314	10374
Calls	1940	1940	1940	5500	5500	5500	6250	6600	7150	7650	7680
Minutes	9376	9376	9376	15460	18464	18464	25652	28922	31550	31789	32019
BUSINESS											
Stations	1476	1476	1476	2513	2537	2680	3074	3232	3702	3726	3746
Calls	1120	1120	1120	2420	2420	2240	2500	2200	2530	2560	2680
Minutes	4198	4198	4198	6676	7976	7976	9473	9640	11164	12246	12007
TOTAL STATIONS	4520	4520	4520	9490	9630	10360	13100	14680	15780	15920	16040
TOTAL CALLS	3400	3400	3400	9000	9000	9000	9600	10000	11000	11600	12000
TOTAL MINUTES	14820	14820	14820	25216	30116	31953	39466	43820	48538	48903	50030

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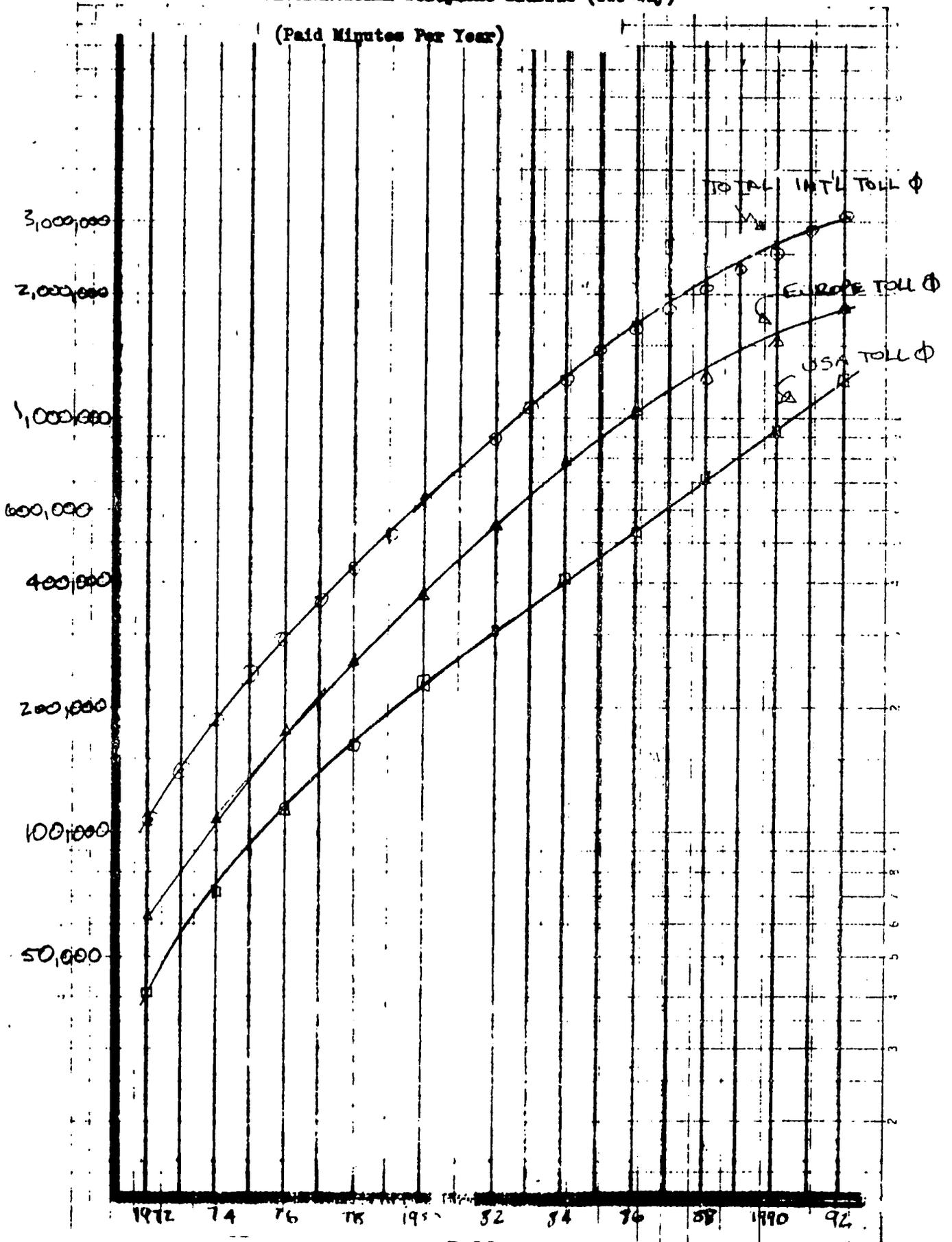
TABLE D-2 Cont'd

BUSY HOUR ESTIMATE SUMMARY

		1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
D-11	GOVERNMENT										
	Stations	1985	2055	2135	2590	2640	2735	2870	3185	3570	3620
	Calls	1420	1520	1560	1968	2112	2136	2256	2280	2760	2784
	Minutes	6014	6028	6545	8288	7741	7798	7802	8582	10222	10242
	RESIDENTIAL										
	Stations	10496	10622	10745	13630	13755	13908	15603	15771	18645	18790
	Calls	7690	7675	7680	10660	11440	11570	12220	12350	14950	15080
	Minutes	32578	32149	32218	43991	41933	42240	43976	46488	55370	54629
	BUSINESS										
	Stations	3789	3933	3875	4830	4875	4927	5227	5284	6235	6290
	Calls	2800	2780	2760	3772	4048	4094	4324	4370	5290	5635
	Minutes	11528	12057	11578	11477	14839	14947	19152	16450	19594	20487
TOTAL STATIONS	16270	16510	16750	21040	21270	21750	23850	24180	28450	28700	
TOTAL CALLS	12000	12000	12000	16400	17600	17800	18800	19000	23000	23200	
TOTAL MINUTES	50120	50234	50341	63756	64510	64985	70930	71520	85186	85358	

Forecast -
International Telephone Traffic (Two-Way)

(Paid Minutes Per Year)



FORECAST -

INTERNATIONAL TELEX & TELEGRAPH TRAFFIC (TWO-WAY)

(PAID MINUTES OR PAID WORDS PER YEAR)

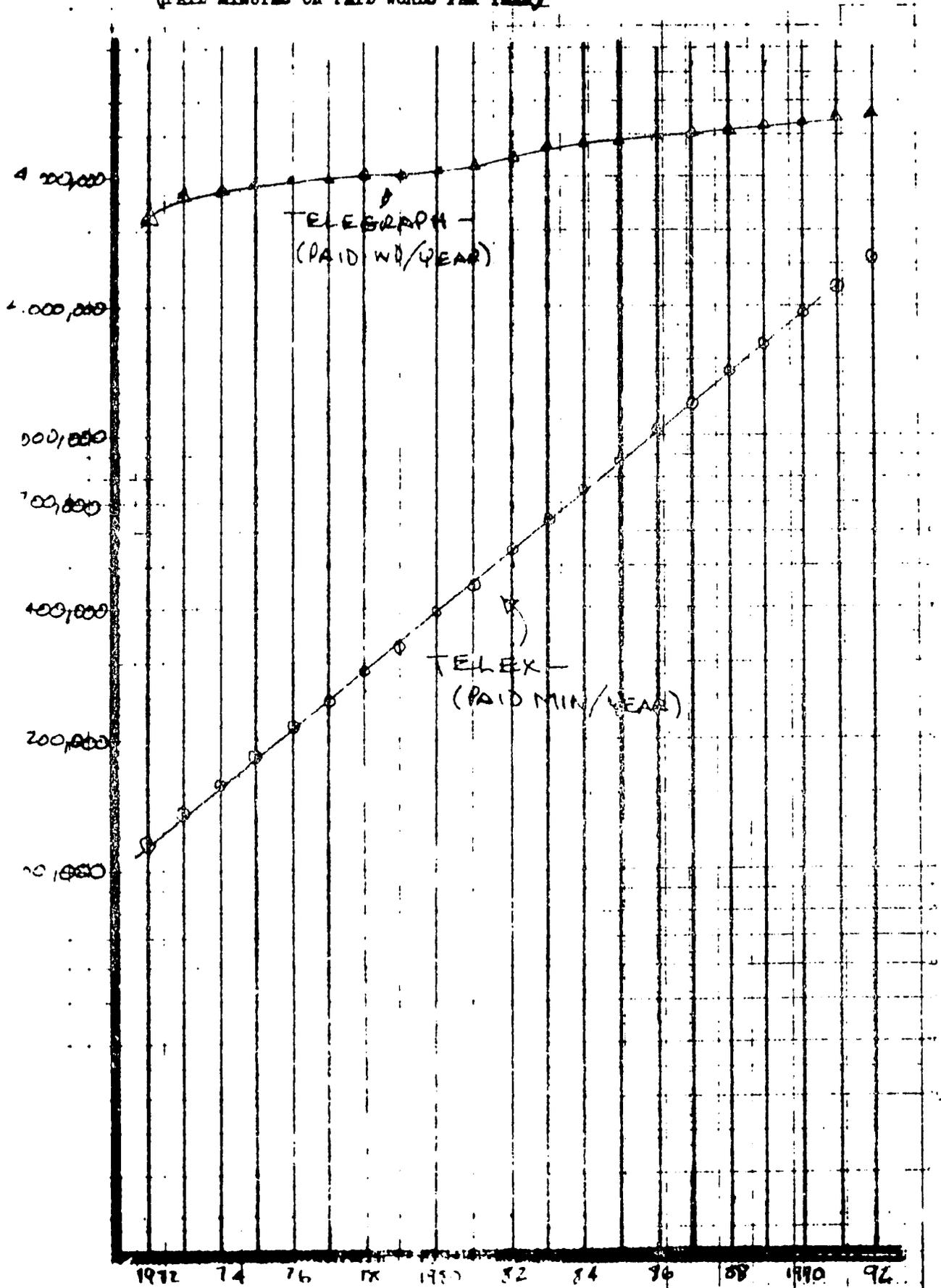


TABLE D-3

GTE
INTERNATIONAL TELECOMMUNICATIONS TRAFFIC
ESTIMATE/FORECAST

	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
Phone: Paid Min/Yr.											
West Africa	3562	4533	5771	7347	8952	11900	17000	19200	24500	28400	32900
Europe	60565	62086	107061	141298	172101	209600	278000	310400	378100	454100	545400
U. S. A.	40289	53464	70946	94146	112975	135600	161500	194500	233800	268700	308700
(Total) (1972 Total Actual)=	() 106416	140083	183778	242841	294028	357100	430900	524500	636400	751200	887000
Telex: Paid Min/ Year											
All International	117500	136700	159100	185200	215500	248200	288800	336200	391200	455600	550000
Telegraph: Paid Md./Year											
All International	3569000	3648000	3720000	3809000	3893000	3931000	4017000	4030000	4195000	4287000	4538000

TABLE B-3 Continued
GTE
INTERNATIONAL TELECOMMUNICATIONS TRAFFIC
ESTIMATE/FORECAST

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Phone: Paid Min/ Year										
Rest of World	38100	44100	51100	59100	68500	79300	91800	106300	123200	142600
Europe	655500	787200	945500	639100	1142000	1255000	1379000	1515300	1665300	1830200
U. S. A.	355000	407900	468700	538500	618500	710700	816600	938300	1078000	1238700
(Total)	104800	1239200	1465300	1636700	1829000	2045000	2287400	2559900	2866500	3211500
Telex: Paid Min/ Year										
All Areas	642100	749000	874000	1020300	1191700	1392300	1627400	1902800	2225500	2603800
Telephone U. S. A. / Year (All Areas)	1637000	1738000	1842500	1948600	1999000	5108500	5220400	5334800	5451700	5571100

TABLE D-4(a)

SOFRECOM FORECAST
(MODIFIED ABSTRACT)

	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
Phone: Paid Min/Yr.											
West Africa	5601	7130	9077	11555	14709	18725	23837	30344	38629	44732	51800
Europe	98400	129101	168380	222227	270672	329579	401549	489087	595708	715445	859250
U. S. A.	63365	84085	111581	148058	177682	213218	253882	307034	368441	423338	486416
(Total)	167366	220316	290038	381850	463063	561622	661248	826465	1002778	1183515	1387466
Telex: Paid Min/Yr.											
"Near by" Africa	19601	22521	25877	29733	34163	39253	45102	51822	59543	65021	71003
"International"	120531	140539	163049	192074	227777	259771	302893	353173	411799	483864	568540
(Total)	140132	163060	189745	220843	256951	299024	347995	404995	471342	548885	639453
Telegraph: Paid Min/Yr.											
"Near by" Africa	669231	603233	552958	714313	730705	746042	762432	779181	796298	813791	831669
"International"	3530153	3607464	3602467	3767201	3849703	3934011	4020166	4018208	4198177	4290118	4384071
(Total)	4199384	4291397	4375425	4481514	4579708	4680053	4782598	4797398	4994475	5103909	5215740

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TABLE D-4(a) Cont'd

SOFRECOM FORECAST
(MODIFIED ABSTRACT)

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Phone: Paid Min/Yr.										
Near Africa	59985	69462	80437	93146	107863	124906	144641	167494	193958	224603
Europe	1031959	1239383	1488499	1635860	1797810	1975793	2171397	2386365	2622616	2882254
U. S. A.	552892	642166	737849	847789	974110	1119252	1286020	1477637	1697805	1950778
(Total)	1650836	1951011	2306785	2576785	2879783	3219951	3602058	4031446	4514379	5057095
Telex: paid Min/Yr.										
"Near by Africa"	77536	84669	92459	100965	110253	120397	131473	143509	156777	171208
"International"	668035	784941	922306	1083709	1273359	1496196	1958031	2065686	4227182 2427171	2851938
(Total)	745571	869610	1014765	1184674	1383612	1616593	1889504	2209255	3994998 253457	3023139
Telegraph: Paid Ad./Year										
Near by Africa	849939	868611	887693	907194	927123	947490	968305	989577	1011316	1033533
"International"	1480082	4578196	4678459	4780917	4885619	4992614	5101952	5213685	5327865	5444545
(Total)	5330021	5446087	5566152	5688111	5812742	5940104	6070257	6203262	6339181	6478078

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TABLE D-4(b)
FRENCH CABLE AND RADIO FORECAST
 (ABSTRACT)

	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
Phone: Paid Min./Yr.											
West Africa	667	827	1075	1158	1309	1479	1671	1888	2133	2346	2581
Europe	1939	2559	3378	4020	4784	5693	6775	8062	9594	10649	11820
U. S. A.	21307	28338	37690	45605	55182	66770	80792	97758	118287	136031	156431
(Total)	23913	31724	42093	50183	61275	73942	89238	107708	130014	149086	170836
Telex: Paid Min./Yr.											
West Africa	551	640	744	815	892	977	1070	1171	1283	1381	1488
Europe	13575	16765	20704	23354	26344	29716	33519	37810	42649	46786	51325
U. S. A.	49397	97806	193656	242070	302588	378235	472793	590992	738740	849557	976983
(Total)	63523	115211	215104	266239	329824	408928	507382	629973	782672	897718	1029796
Telephone: Id. Hd./Year											
West Africa	27510	21781	23132	24219	25358	26543	27797	29104	30471	30837	31207
Europe	174727	186025	198180	202936	207807	212794	217901	223131	228486	230543	232617
U. S. A.	12853	12982	13112	13243	13375	13509	13644	13780	13918	14057	14198
(Total)	208090	220848	231424	240398	246540	252402	259342	266015	272875	275437	278022

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TABLE D-4 (b) Continued

FRENCH CABLE AND RADIO FORECAST

(ABSTRACT)

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Phone: Paid Min/Yr.										
West Africa	2825	3123	3435	3779	4157	4573	5030	5533	6086	6695
Europe	13120	14563	16165	17943	19917	22108	24540	27239	30235	33561
U. S. A.	179900	206005	237919	273606	314647	361844	416121	478539	530320	632868
(Total)	199825	227571	257519	295328	338721	388525	445691	511311	686641	673124
Telex: Paid Min/Yr.										
West Africa	1602	1726	1858	2001	2156	2322	2500	2693	2900	3124
Europe	56303	61765	67756	74328	81538	69447	98123	107641	118082	129536
U. S. A.	1123531	1292060	1485869	1708750	1965062	2259821	2598795	2988614	3436906	3952441
(Total)	1181436	1355551	1555483	1785879	2048756	2331590	2699418	3098948	3557088	4085101
Telegrams: Fl. Wk/										
West Africa	31582	31061	30344	30738	33125	33523	83925	34332	34744	35161
Europe	204711	236711	238955	241165	243075	245465	247674	249903	252152	254422
U. S. A.	14710	14483	14600	14774	14922	15071	15222	15374	15528	15683
(Total)	253003	282255	283900	286677	291122	294059	296821	299609	302424	305266

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PROCUREMENT & INSTALLATION COSTS

This Annex presents detailed breakdowns of estimates of all major line items associated with the A.I.D. loan application. Thirty-three such items are grouped into four categories:

Items E1 through E16	Central Office Equipment ("COE") items
Items E17, E18, & E19	Buildings, Vehicles, & Tools ("BVT") items
Items E20 thru E31	Outside Plant ("OSP") items
Items E32 & E33	Unclassified items.

The basis of estimate for the four categories is:

- a) Major COE items are estimated from current prices of identical or similar equipment as determined, by GTE-ISC/Waltham, and include minor material and weight estimates.
- b) Major OSP items are based upon current prices from the 1972 AE catalog. These are believed to be competitive with other large U.S. manufacturers and suppliers.
- c) Minor OSP material is taken as a flat 25% of major OSP material, in accordance with standard telephone estimating practices.
- d) BVT costs are current catalog prices where applicable, and otherwise they are engineering estimates.
- e) Unclassified items are estimated on the basis of management and engineering judgment.
- f) Net weights, where not explicitly included in quotations, are taken from catalog listings of identical or similar items, plus a 30% allowance for minor materials.
- g) Inland packing and freight (USA) is estimated at 5¢/lb, based upon current invoiced values for recent shipments to Liberia.
- h) Ocean shipping is estimated at 11¢/lb, and insurance at \$3.25/\$1000 valuation, based upon current invoiced values for recent shipments to Liberia.
- i) Material contingencies applied range from zero to

12% or more, based upon engineering judgment of price, effort, and schedule uncertainties involved.

J) Labor contingencies (generally shown in hours), range from zero to about 25%, based upon engineering judgment of effort and schedule uncertainties, and also include subjective estimates on the applicability of U.S.A. techniques and work habits to Liberian situation. These contingencies also include, as a portion of the schedule uncertainties, allowances for possible vendor price escalations over the next two years.

k) For OSP labor, most items are based upon the assumption of contract installation crews with Liberian crew assistance. Estimating rates are:

Cable placing-aerial.....	20 hours/1000 feet
Cable placing-underground/buried..	25 hours/1000 feet
Cable splicing-aerial.....	10 hours/1000 feet
Cable splicing-underground.....	20 hours/1000 feet
Engineering & supervision @ 1 hour/6 construction hours	

l) For COE labor, most items are based upon a combination of contract and Liberian crews according to engineering judgment. Some items appear to deserve consideration of second-contractor (e.g., L. M. Ericsson) assistance. In cases of major switchgear, labor estimates were included with those received from Waltham and these were adjusted by engineering judgment for suitability to conditions in Liberia.

COE SUMMARY

	\$	\$
	<u>Local</u>	<u>U.S.</u>
E1 - Main/Sinkor Switching	130,000	1,100,000
E2 - Paynesville Switch	20,000	450,000
E3 - Upcountry Switch Additions	117,000	24,000
E4 - " " "	11,000	122,000
E5 - " " "	30,000	4,000
E6 - Telex Machines	2,500	81,000
E7 - Diesel Equipment	1,000	81,500
E8 - Coastal Link	150,000	1,200,000
E9 - SSB Replacement	1,500	16,500
E10 - Monrovia Microwave	41,000	215,000
E11 - Upcountry Microwave		
E12 - Microwave Multiplex		
E13 - HF Radio (NP & Beirut) XMT	-	310,000
E14 - HF Radio RCV		
E15 - HF Radio XMT on-line Standby		
E16 - HF Radio RCV on-line Standby		
Sub-totals	<u>\$504,000</u>	<u>\$3,604,000</u>
COE Total	\$4,108,000	

*Third Country Expenditures

- E1 - \$46,000 - LME Material & Labor to Relocate Main or Sinkor.
- E3 - \$116,000 - LME Trunk Additions to Main Transit.
- E4 - \$11,500 - LME Installers to Re use Retired LME Outcountry Lines.
- E5 - \$3,700 - LME Additions to Outcountry Offices.
- E12 - \$10,900 - LME Filters to Reuse Firmer Coastal MUX on Upcountry.

BUILDINGS, VEHICLES, TOOLS SUMMARY

	\$ <u>Local</u>	\$ <u>U.S.</u>
E17 Land and Buildings	222,000	7,000
E18 Major Tools	-	32,000
E19 Vehicles	-	<u>153,000</u>
LBVT sub-totals:	<u>\$222,000</u>	<u>\$192,000</u>

No third country expenditures.

OSP SUMMARY

	\$ <u>Local</u>	\$ <u>U.S.</u>
E20 - Bushrod Relief	-	341,000
E21 - Monrovia Primary	1,600	37,000
E22 - Monrovia Secondary	6,000	96,000
E23 - Monrovia Rehab. & Replace.	3,000	97,000
E24 - Sinkor Primary	1,200	134,000
E25 - Sinkor Secondary	2,000	80,000
E26 - Sinkor Rehab. & Replace.	4,000	102,000
E27 - Paynesville Trunk	3,000	124,000
E28 - Paynesville Primary	3,000	172,000
E29 - Paynesville Secondary	4,000	102,000
E30 - Upcountry Growth & Rehab.	4,800	142,000
E31 - Station Connection	<u>160,000</u>	<u>383,000</u>
OSP Sub-Totals	<u>\$225,000</u>	<u>\$1,810,000</u>
OSP Total:	\$2,035,000	

No third country expenditures.

Explanatory Notes - 'Unclassified Items' Summary

E32 - Maintenance and Rehabilitation Contract -

Many parts of LTA's inside and outside plant are at or near the ends of the economic service life, or as a result of unsatisfactory prior maintenance are presently in a condition that maintenance costs are excessively high and service is very poor. Moreover, as the LTA plant is expanded it is expectable that there will be a considerable lag in time between the installation of equipment and apparatus and the completion of training of sufficient Liberian technical personnel. These LTA financed contract personnel will properly rehabilitate present facilities for the satisfactory operation and growth of LTA, and to assure adequate preventive and corrective maintenance of rehabilitated and expanded plant in the interim period until a sufficiently large pool of trained Liberian technicians is available.

E33 - Management and Maintenance Training Contract -

To profitably operate and grow LTA through the critical interim years of the mid-1979's, experienced telecommunications executives, administrators and technicians will be provided to advise and provide additional training and support to their Liberian counterparts. This contract will provide for two years of such assistance and support.

This contract will also provide for an expanded program of training to provide complete and balanced training in corrective and preventive maintenance of all current and expected equipment, apparatus, and plant items used (or to be used) by LTA. Without such a program it will be difficult and expensive to operate LTA, and more difficult and expensive for LTA to reduce its dependence upon expatriate personnel in a reasonable period of time.

OVERALL SUMMARY OF PROJECT COST

	<u>\$Local</u>	<u>\$U.S.</u>	<u>AID</u>	<u>GOL</u>
Central Office Equipment	504,000	3,604,000	3,846,000	262,000
Outside Plant	225,000	1,810,000	2,035,000	-
Buildings, Vehicles, Tools	<u>222,000</u>	<u>192,000</u>	<u>192,000</u>	<u>222,000</u>
Subtotal	\$ 951,000	\$5,606,000	6,073,000	484,000
Engineering		800,000	800,000	-
Management and Training	373,000	1,627,000	1,627,000	373,000
Maintenance and Rehabilitation	<u>40,000</u>	<u>1,103,000</u>	<u>-</u>	<u>1,143,000</u>
Subtotal	\$413,000	\$3,530,000	\$ 2,427,000	\$1,516,000
Totals	\$ 1,364,000	\$9,136,000	\$8,500,000	\$2,000,000
<u>Project Total:</u>	<u>\$10,500,000</u>			

20. Year Plan
Capital Expenditure Schedule

Land & Building

In 1979, a new office north of Main will be required, as well as buildings for an earth station. All other GA/PD. is small items, primarily air-conditioner replacements.

COE Switching

A CT3 for Fan Africa switching is budgeted in 77 & 78 with further additions in 84 & 85. Other GA is additional lines to meet the forecast. PD is primarily batteries.

COE Circuit

A satellite earth station in Liberia is scheduled for 79 & 80. The replacement of Monrovia-Sanniquellie RCA Microwave is scheduled in 80 & 81. The replacement of Monrovia-Robertsport is scheduled in 85. Channel additions and diesel replacements make up the remaining GA/PD.

Telex Apparatus

Continuous additions to meet growth plus the replacement of these 5 - 7 year-lived items requires this GA/PD.

Station Connections

These dollars are required to meet forecasted growth and retire the connections based on 12-14 year life.

Station Apparatus

These dollars are required to meet forecasted growth of stations and extensions, and retire worn or defective instruments (based on 12 - 15 year life). It assumes that the present recovery rate on instruments of about 6% will grow to at least 40% within 10 years.

Outside Plant

These figures are based on placing one new office north of Main (probably Brewerville or Gardnerville) in 1979, meeting forecasted growth, and retiring cable, primarily aerial, per its estimated 12 year life.

**Furniture,
Vehicles & Tools**

These dollars amounts reflect the increased furniture, vehicles, and tools required to maintain the increased number of customers and personnel as forecasted. The plant displaced represents the estimated 4 year life of vehicles and tools.

TELECOMMUNICATIONS RATE STRUCTUREI- Charges for services:A: Telephone-

1) Installation and connection--

- a) Residence, single-line business, and single-line Government installations: \$30.00 per station for installations requiring not more than 120 meters of wire to the nearest usable connection point; lengths over 120 meters at an additional charge of \$0.20 per meter or fraction thereof.

Extensions within the same building or structure: \$5.00 per extension; Outside extensions and/or extensions at a separate building or structure: \$5.00 at the same address; \$30.00 if at a different address than the primary connection. ("Remote extension").

Transfer of station (Customer's same number) from one location to another: \$15.00 per station for (new) installations requiring not more than 120 meters of wire to the nearest usable connection point; lengths over 120 meters at an additional charge of \$0.20 per meter or fraction thereof.

Inside move (transfer or relocation of existing instrument at same address): \$5.00.

Transfer (Transfer of telephone service from one customer to another, when new customer agrees to pay any arrears bills): \$5.00.

Reconnection (Reconnection or restoral of service blocked for non-payment or excessive arrears): \$5.00.

Instrument Change (Change or replace telephone instrument at customer's request, where change or replacement would not be required for normal telephone service): \$5.00.

- b) PBX/PABX and other multiple-line installations: \$30.00 per line plus additional labor and material charges on a negotiated contract basis.

2) Monthly Service charges--

- a) Residence service \$9.00 per month per station plus \$2.00 per month per extension.

For Remote Extensions as defined in par. (1)(a), there is a monthly charge of \$2.00 per $\frac{1}{4}$ mile circuit distance, or fraction thereof. Circuit distance for this purpose is defined as the actual route distance between the location of the primary telephone instrument and the location of the remote extension.

- b) Business service-- single-line: \$15.00 per month per station plus \$2.00 per month per extension.

For Remote Extensions as defined in para. (1)(a), there is a monthly charge of \$2.00 per $\frac{1}{4}$ mile circuit distance, or fraction thereof. Circuit distance for this purpose is defined as the actual route distance between the location of the primary telephone instrument and the location of the remote extension.

-- PBX/PABX Multiple-line: \$21.00 per line per month.

- c) Government service: Same charges as (2)(b) ("Business service").

- d) Private Lines: Private lines may be furnished by LTA at a monthly charge of \$7.00 per mile. The mileage distance upon which the charge is based is computed as the airline distance from the first location to the second location; if the circuit is furnished through any intermediate central office, and/or by microwave through any repeater stations, the mileage will be computed from the first location to any repeater station or central office, to the next repeater station or central office (if any), and then to the next repeater station or central office (if any), and so on from the final repeater station or central office to the second location.

- 3) Call-unit ("CU") charges-- For all services, first 100 CU per month per line are included in the monthly service charge (Item 2); additional CU over 100 per line per month at \$0.04 per CU.

- a) Local calls (within an exchange area) are charged at 1 CU.
- b) Toll calls (within Liberia)-- the number of CU charged for a toll call is based upon the duration of the call and the distance between the called and calling exchanges; five (5) rates are established for calls within Liberia.

(1)(A)(3) cont'd.

c) Coin-box charges are based upon Tables 1 and 2 (above), as follows:

- i) Local calls (within an exchange)-- \$0.10 for any duration.
 - ii) Toll calls-- as in Table 2 (page C3), but rounded up or down to multiples of \$0.05 as follows: If the toll charge as computed from Tables 1 and 2 has as its last digit a "1" or a "6", the charge is rounded DOWN to the next lower multiple of \$0.05; if the toll charge as computed from Tables 1 and 2 has as its last digit a "2", "3", "4", "7", "8", or "9", the charge is rounded UP to the next higher multiple of \$0.05; if the toll charge has as its last digit a "0" or "5", the charge shall be in accordance with Table 2.
- 4) International Toll charges-- Rates are on a scheduled basis per minute, with a minimum charge of three (3) minutes. Present schedules (March 1973) are shown below in Dollars per minute:
- | | | |
|--------------------------------|--|--|
| \$1.42 first minute, | } | -- Ivory Coast (DIRECT)* (*see also \$3.00 schedule) |
| \$1.09 each succeeding minute) | | |
| \$1.815 -- Nigeria (DIRECT)* | | (*see also \$3.00 schedule) |
| \$3.00 -- | Algeria, Cameroon, Central African Rep., Chad, Congo (Brazzaville), Dahomey, France, Gabon, Guinea, Ivory Coast*(Via Paris), Luxembourg, Malagasy Rep., Mali, Mauritania, Monaco, Morocco, Niger, Nigeria*(Via Paris), Senegal, Togo, Tunisia, United Kingdom, Upper Volta, U.S.A. (Sundays only). | |
| \$3.10 -- | Balaeric Islands, Belgium, Germany, Gibraltar, Holland, Ireland, Italy, Spain, Switzerland. | |
| \$3.60 -- | Albania, Austria, Czechoslovakia, Denmark, Malta, Norway, Poland, Portugal, Sweden, Vatican City, Yugoslavia. | |
| \$4.00 -- | Bulgaria, Canada, Canary Islands, Finland, Greece, Hungary, Libya, Rumania, Saudi Arabia, Somalia, Turkey, U.S.A. (Other than Sunday), U.S.S.R. | |
| \$4.20 -- | Iceland. | |
| \$5.00 -- | Alaska, Argentina, Ascension Island, Australia, Bahamas, Barbados, Brazil, Burundi, Chile, China, Colombia, Costa Rica, Cyprus, Dominican Rep., Ecuador, Egypt, Ethiopia, Honduras, Hong Kong, India, Iran, Israel, Jamaica, Japan, Jordan, Kenya, Kuwait, Lebanon, Mexico, Nicaragua, Panama, Pakistan, Peru, Philippines, Puerto Rico, Salvador, Singapore, South Africa, Syria, Tanzania, Trinidad, Uganda, United Arab Rep., Uruguay, Venezuela, Virgin Island, Zaire. | |

(I) (A) (4) cont'd.

Note: It is anticipated that certain International Toll Schedules may be revised in 1973; these may result in the following rates per minute (3-minute minimum):

\$3.00--Hawaii, U.S.A. (48 contiguous states) ---- Sunday rate
\$4.00--Hawaii, U.S.A. (48 contiguous states) ---- Weekday rate
\$4.00--Alaska (all zones):
 Bermuda, Puerto Rico, Virgin Islands ---- Sunday rate
\$5.00--Alaska (all zones):
 Bermuda, Puerto Rico, Virgin Islands ---- Weekday rate.

5) Maintenance charges--

- a) For all single-line installations, maintenance charges are included in the Monthly Service charge (item (2), above).
- b) FBX/PABX and other multiple-line installations: Private exchanges may be maintained by LTA upon execution of a contract for such services between LTA and the owner or user of the private exchange. Present rates are based upon a nominal charge of \$30.00 per line per year plus \$16.00 per year per extension or telephone instrument served by the private exchange. Maintenance under such contracts is limited to routine inspection, correction of minor faults and deficiencies, and replacement of failed fuses, indicator lamps, and equivalent small hardware items; work is done only during normal LTA working hours. The contracts exclude the following:

time and materiel costs arising from faults beyond the control of LTA;
time and materiel costs arising from circumstances beyond the control of LTA;
time and materiel costs resulting from maintenance activities by other than LTA or LTA-authorized personnel;
time and materiel costs arising from modifications or additions to the private system; and
materiel costs for major replacement items.

(I) cont'd.

B: Telegraph-

- 1) Installation and Connection-- (not applicable)
 - 2) Monthly Service Charge--)
 - 3) Message and Word rates--)
- All Telegraph Service charges are described and detailed in attachment C/RS:II/1, pages C7 through C18 (following).

C: Telex--

- 1) Installation and Connection--
 - a) (All installations) \$50.00 per station for installations requiring not more than 120 meters of wire to the nearest usable connection point; lengths over 120 meters at an additional \$0.20 per meter or fraction thereof.
 - b) Transfer of connection or station (customer's same number) from one location to another: \$15.00 per station for (new) installations requiring not more than 120 meters of wire to the nearest usable connection point; lengths over 120 meters at an additional \$0.20 per meter or fraction thereof.
- 2) Monthly Service Charges--
 - a) Machine Rental fee: \$50.00 per month per instrument
 - b) In addition to the Machine Rental fee, a service charge of \$30.00 per month per line.
- 3) Call-unit ("CU") charges-- All Telex calls within Liberia are charged at CU rates similar to those established for telephone service except that there is no "Local" rate for Telex; for Telex purposes ONLY, calls within an exchange area shall be charged for at Rate 1 as defined in Tables 1 and 2, section (A)(3)(b), and all other intra-Liberia Telex calls shall be charged for at rates as determined from Tables 1 and 2, section (A)(3)(b).
- 4) International Telex charges shall be in accordance with the schedule shown in attachment C/RS:II/2, pages C19 through C21 (following).

TELECOMMUNICATIONS AUTHORITY
A Division of Public Utilities Authority

The Telecommunications Authority is pleased to present its revised International Telegraph Rates for telegram handled via RCA Communications, New York, the West German Posts & Telegraph system, The International Telegraph System of Sweden, The International Telegraph System of Italy, The Sierra Leone External Telecommunications Ltd., The Nigerian External Telecommunications and via its own system with the following explanations:

GENERAL: All words in a message, including the address and signature, are counted and charged for.

NOTE: A domestic tax of one-half cent per word is charged and must be paid on all telegrams irrespective of the class or destination.

PRESS TELEGRAMS Urgent press and ordinary telegrams will be subject to a minimum charge for fourteen words. All press messages must be prefixed 'PRESS', must be written in plain language and the use of more than one language in one message is not permitted. The text must consist of information and news intended for publication in newspapers, periodicals, or radio broadcasting and must be addressed to such agencies. Generally speaking, ordinary press rates are 1/3 of the ordinary rate; Urgent Press rate will be the same as for ordinary telegrams.

ORDINARY GOVERNMENT TELEGRAMS: Rates for ordinary government telegrams will be the same as ordinary telegrams except where agreement is reached for a special government rate via a specified route.

ORDINARY RATE (FULL RATE) Ordinary telegrams are subordinated in transmission only to telegrams relating to safety of life at sea or in the air, ordinary government telegrams for which the sender has not renounced priority of transmission, and urgent press telegrams. Ordinary telegrams may be written in plain or secret language, or a combination of both, Plain language words, whether they have a secret meaning or not, will be counted at the rate of fifteen letters to the word.

Artificial words, composed exclusively of letters, are counted at the rate of five characters to the word. Commercial marks, reference numbers, etc found in price-lists, catalogues, etc. available to the public, may be composed of letters, figures, signs or a mixture thereof, and each such group is counted at the rate of five characters to the word. Messages not otherwise marked will be transmitted and charged for as full rate telegrams Ordinary telegrams are subject to a minimum charge for seven words.

URGENT TELEGRAMS Double ordinary rates, subject to a minimum charge for seven words.

RADIO LETTERS(LT): This service is permitted for messages which permit some deferment, The text of LT's must be expressed wholly in plain language, presenting an intelligible meaning. Secret language is not permitted. Commercial marks, trade marks etc. are admissible provided they contain no secret meaning. Radioletter telegrams must bear the indicator "LT" written immediately before the address and this indicator is counted and charged for as one word. Radioletters will be delivered to the addressee not earlier than the morning of the day following the date of filing. LT messages will be subject to a minimum charge for twenty-two words.

(Sgd.) SAMUEL H. BUTLER, SR.

SAMUEL H. BUTLER, SR.

EXECUTIVE OFFICER.
PUA-TELECOMMUNICATIONS AUTHORITY, R. L.

PUA TELECOMMUNICATIONS AUTHORITY
20 YEAR ESTIMATED INCOME STATEMENT
(DOLLAR IN THOUSAND)

ANNEX G

	1972	1973 1983	1974 1984	1975 1985	1976 1986	1977 1987	1978 1988	1979 1989	1980 1990	1981 1991	1982 1992
OPERATING REVENUES											
TOTAL GROSS REVENUES		1817	1918	2046	2170	3374	4148	4907	5551	5925	6410
LESS: UNCOLLECTIBLE		91	96	103	109	169	207	246	278	296	320
TOTAL OPERATING REVENUES		1726	1822	1943	2061	3205	3941	4661	5273	5629	6090
OPERATING EXPENSES											
OPERATIONS		879	956	975	1015	1056	1116	1174	1223	2123	2051
COMMERCIAL		68	70	89	91	93	95	97	116	118	121
GENERAL OFFICE		150	189	211	238	264	291	309	322	336	351
OTHER OPERATING EXPENSES		97	1121	1384	637	593	740	721	376	332	257
TOTAL ABOVE EXPENSES		1194	2336	2659	1981	2006	2242	2301	2037	2909	2780
DEPRECIATION EXPENSE		276	293	369	594	805	880	938	1018	1599	1699
TOTAL OPERATING EXPENSES		1470	2629	3028	2575	2811	3122	3239	3055	4508	4479
NET OPERATING INCOME (LOSS)		256	<807>	<1085>	<514>	394	819	1422	2218	1121	1611

PUA TELECOMMUNICATIONS AUTHORITY
20 YEAR ESTIMATED INCOME STATEMENT
(DOLLAR IN THOUSAND)

ANNEX

	1972	1973 1983	1974 1984	1975 1985	1976 1986	1977 1987	1978 1988	1979 1989	1980 1990	1981 1991	1982 1992
OPERATING REVENUES											
TOTAL GROSS REVENUES		6892	7359	7863	9365	9926	10562	11702	12564	14486	15521
LESS: UNCOLLECTIBLE		345	368	393	468	496	528	585	628	724	776
TOTAL OPERATING REVENUES		6547	6991	7470	8897	9430	10034	11117	11936	13762	14745
OPERATING EXPENSES											
OPERATIONS		2173	2298	2393	2497	2616	2725	2841	2975	3119	3249
COMMERCIAL		123	126	129	180	184	188	192	196	241	247
GENERAL OFFICE		363	375	395	418	434	449	458	487	507	512
OTHER OPERATING EXPENSES		293	270	223	199	241	223	205	185	163	142
TOTAL ABOVE EXPENSES		2952	3069	3140	3294	3475	3585	3696	3843	4030	4150
DEPRECIATION EXPENSE		1739	1790	1856	1963	2019	2086	1428	1473	1565	1665
TOTAL OPERATING EXPENSES		4691	4859	4996	5257	5494	5671	5124	5316	5595	5815
NET OPERATING INCOME (LOSS)		1856	2132	2474	3640	3936	4363	5993	6620	8167	8930

PUA TELECOMMUNICATIONS AUTHORITY
20 YEAR ESTIMATED BALANCE SHEET
(DOLLARS IN THOUSANDS)

ANNEX G

	1972	1973 1983	1974 1984	1975 1985	1976 1986	1977 1987	1978 1988	1979 1989	1980 1990	1981 1991	1982 1992
Assets											
Fixed Assets:											
Gross Plant in Service	8347	8493	8810	10340	12292	15052	16008	16922	17475	21772	23095
Less Depr. Reserve	3958	4234	4507	4828	5137	5028	5763	6542	7406	8808	9583
Net Plant in Service	4389	4259	4303	5512	7155	10024	10245	10380	10069	12965	13512
Plant Under Construction	-	113	104	2027	2450	650	500	1258	2958	945	247
Total Fixed Assets	4389	4372	4407	7539	9605	10674	10745	11638	13027	13910	13759
Current Assets:											
Cash	136	250	300	300	350	350	350	400	400	450	450
Special Cash Deposits	200	464	422	230	437	388	255	824	1387	1369	2905
Due From Customers	503	590	625	925	1030	1055	1275	1340	1410	1445	1455
Other Current Assets	19	50	75	75	100	100	100	100	150	150	150
Total Current Assets	858	1354	1422	1530	1917	1117	1980	2664	3347	3414	4960
Total Liabilities and Equity	5247	5726	5829	9069	11522	11791	12725	14302	16374	17324	18719
Capital & retained earnings											
Capital	5050	5050	5050	5050	5050	5050	5050	5050	5050	5050	5050
Retained Earnings	28	284	(523)	(1608)	(2122)	(1728)	(909)	513	2731	3852	5463
Total Equity	5078	5334	4527	3442	2928	3322	4141	5563	7781	8902	10513

PUA TELECOMMUNICATIONS AUTHORITY
20 YEAR ESTIMATED BALANCE SHEET
(DOLLARS IN THOUSANDS)

ANNEX G

	1972	1973 1983	1974 1984	1975 1985	1976 1986	1977 1987	1978 1988	1979 1989	1980 1990	1981 1991	1982 1992
Assets											
Fixed Assets:											
Gross Plant in Service		23561	24090	24250	25491	26096	26746	27408	28078	28742	29412
Less Depr. Reserve		11107	12680	14309	15457	17148	18932	20039	21067	22061	23030
Net Plant in Service		12454	11410	9941	10034	8948	7814	7369	7011	6681	6382
Plant Under Construction		307	530	1120	315	390	445	535	635	735	835
Total Plant		12761	11940	11061	10349	9338	8259	7904	7646	7416	7217
Current Assets:											
Cash		500	500	500	550	550	550	600	600	600	650
Special Cash Deposits		5613	8455	11732	15703	20614	26010	32257	39009	47155	56163
Due From Customers		1455	1470	1570	1730	1780	1800	1855	1990	2295	2465
Other Current Assets		150	150	175	175	175	200	200	200	250	250
Total Current Assets		7718	10575	13977	18158	23119	28560	34912	41799	50300	59528
Total Liabilities and Equity		20479	22515	25038	28507	32157	36819	42816	49445	57716	66745
Capital & retained earnings											
Sub-in Capital		5050	5050	5050	5050	5050	5050	5050	5050	5050	5050
Unappropriated earned Surplus		7319	9451	11925	15565	19501	23864	29857	36477	44644	53574
Total Equity		12369	14501	16975	20615	24551	28914	34907	41527	49694	58624

**FUA TELECOMMUNICATIONS AUTHORITY
20 YEAR ESTIMATED BALANCE SHEET
(DOLLARS IN THOUSANDS)**

ANNEX G

	1972	1973 1983	1974 1984	1975 1985	1976 1986	1977 1987	1978 1988	1979 1989	1980 1990	1981 1991	1982 1992
Long Term Debt:											
U.S.A.I.D. Loan 1973		6309	5993	5677	5361	5045	4729	4413	4097	3781	3465
Total Long Term Debt		6309	5993	5677	5361	5045	4729	4413	4097	3781	3465
Liabilities:											
Current Liabilities		1485	1705	2070	2215	2545	2860	3180	3505	3925	4340
Current Portion Long Term Debt		316	316	316	316	316	316	316	316	316	316
Total Current Liabilities		1801	2021	2386	2531	2861	3176	3496	3821	4241	4656
Total Liabilities Equity		20479	22515	25038	28507	32457	36819	42816	49445	57716	66745

PUA TELECOMMUNICATIONS AUTHORITY
20 YEAR CASH FLOW PROJECTION
(DOLLARS IN THOUSAND)

ANNEX G

	1972	1973 1983	1974 1984	1975 1985	1976 1986	1977 1987	1978 1988	1979 1989	1980 1990	1981 1991	1982 1992
Source of Funds											
Total Operating Revenues		1726	1822	1943	2061	3205	3941	4661	5273	5629	6090
Operating Expenses Requiring Funds		<1194>	<2336>	<2659>	1981	2006	2242	2301	2037	2909	2780
Net Sources of Funds from Operation		532	<514>	<716>	80	1199	1699	2360	3236	2720	3310
Borrowings:											
U.S.A.I.D. Loan 197- 197-		167	835	3960	2927	-	-	-	-	-	-
Total Borrowings		167	835	3960	2927	-	-	-	-	-	-
Total Source of Funds		699	321	3244	3007	1199	1699	2360	3236	2720	3310
Application of Funds											
Expenditures:											
U.S.A.I.D. Financed		167	314	3276	2815	-	-	-	-	-	-
PA Financed		89	<7>	121	<380>	822	1451	1566	2153	2239	1316
Total Construction		256	307	3397	2435	822	1451	1566	2153	2239	1316
Debt Services:											
U.S.A.I.D. Interest		3	21	104	225	276	276	265	254	243	232
U.S.A.I.D. Amort. of Principal		-	-	-	-	-	-	316	316	316	316
Total Debt Service		3	21	104	225	276	276	581	570	559	548
Change in Working Capital											

PWA TELECOMMUNICATIONS AUTHORITY
20 YEAR CASH FLOW PROJECTION
(DOLLARS IN THOUSAND)

ANNEX G

	1972	1973 1983	1974 1984	1975 1985	1976 1986	1977 1987	1978 1988	1979 1989	1980 1990	1981 1991	1982 1992
Inc. (Dec) Cash		378	8	<192>	257	<49>	<133>	619	563	32	1536
Inc. (Dec) Customer Receivables		87	35	300	105	25	220	65	70	35	10
Inc. (Dec) Other Current Assets		31	25	-	25	-	-	-	50	-	-
(Inc.) Dec Current Liabilities		<56>	<75>	<365>	<40>	125	<115>	<471>	<170>	<145>	<100>
Total Application of Funds		699	321	3244	3007	1199	1699	2360	3236	2720	3310

PUA TELECOMMUNICATIONS AUTHORITY
20 YEAR CASH FLOW PROJECTION
(DOLLARS IN THOUSAND)

ANNEX

G

	1972	1973 1983	1974 1984	1975 1985	1976 1986	1977 1987	1978 1988	1979 1989	1980 1990	1981 1991	1982 1992
Source of Funds											
Total Operating Revenues		6547	6991	7470	8897	9430	10034	11117	11936	13762	14745
Operating Expenses Requiring Funds		2952	3069	3140	3294	3475	3585	3696	3843	4030	4150
Net Sources of Funds from Operation		3595	3922	4330	5603	5955	6449	7421	8091	9732	10595
Borrowings:											
U.S.A.I.E. Loan 197- 197-		-	-	-	-	-	-	-	-	-	-
Total Borrowings		-	-	-	-	-	-	-	-	-	-
Total Source of Funds		3595	3922	4330	5603	5955	6449	7421	8091	9732	10595
Application of Funds											
Expenditures:											
U.S.A.I.E. Financed		-	-	-	-	-	-	-	-	-	-
PA Financed		520	759	778	1063	831	841	918	1069	1202	1344
Total Construction		520	759	778	1063	831	841	918	1069	1202	1344
Net Services:											
U.S.A.I.E. Interest		221	210	199	188	177	166	155	144	133	122
U.S.A.I.E. Amort. of Principal		316	316	316	316	316	316	316	316	316	316
Total Net Service		537	526	515	504	493	482	471	460	449	438
Change in Working Capital											

PUA TELECOMMUNICATIONS AUTHORITY
20 YEAR CASH FLOW PROJECTION
(DOLLARS IN THOUSAND)

ANNEX G

	1972	1973 1983	1974 1984	1975 1985	1976 1986	1977 1987	1978 1988	1979 1989	1980 1990	1981 1991	1982 1992
Inc. (Dec) Cash		2758	2842	3277	4021	4911	5396	6297	6752	8146	9058
Inc. (Dec) Customer Receivables		-	15	100	160	50	20	55	135	305	170
Inc. (Dec) Other Current Assets		-	-	25	-	-	25	-	-	50	-
(Inc.) Dec Current Liabilities		<220>	<220>	<365>	<145>	<330>	<315>	<320>	<325>	<420>	<415>
Total Application of Funds		3595	3922	4330	5603	5955	6449	7421	8091	9732	10595

FIGURE H-1: INTERNAL RATE OF RETURN DEMONSTRATION (Graphical)
20-Year Plan.

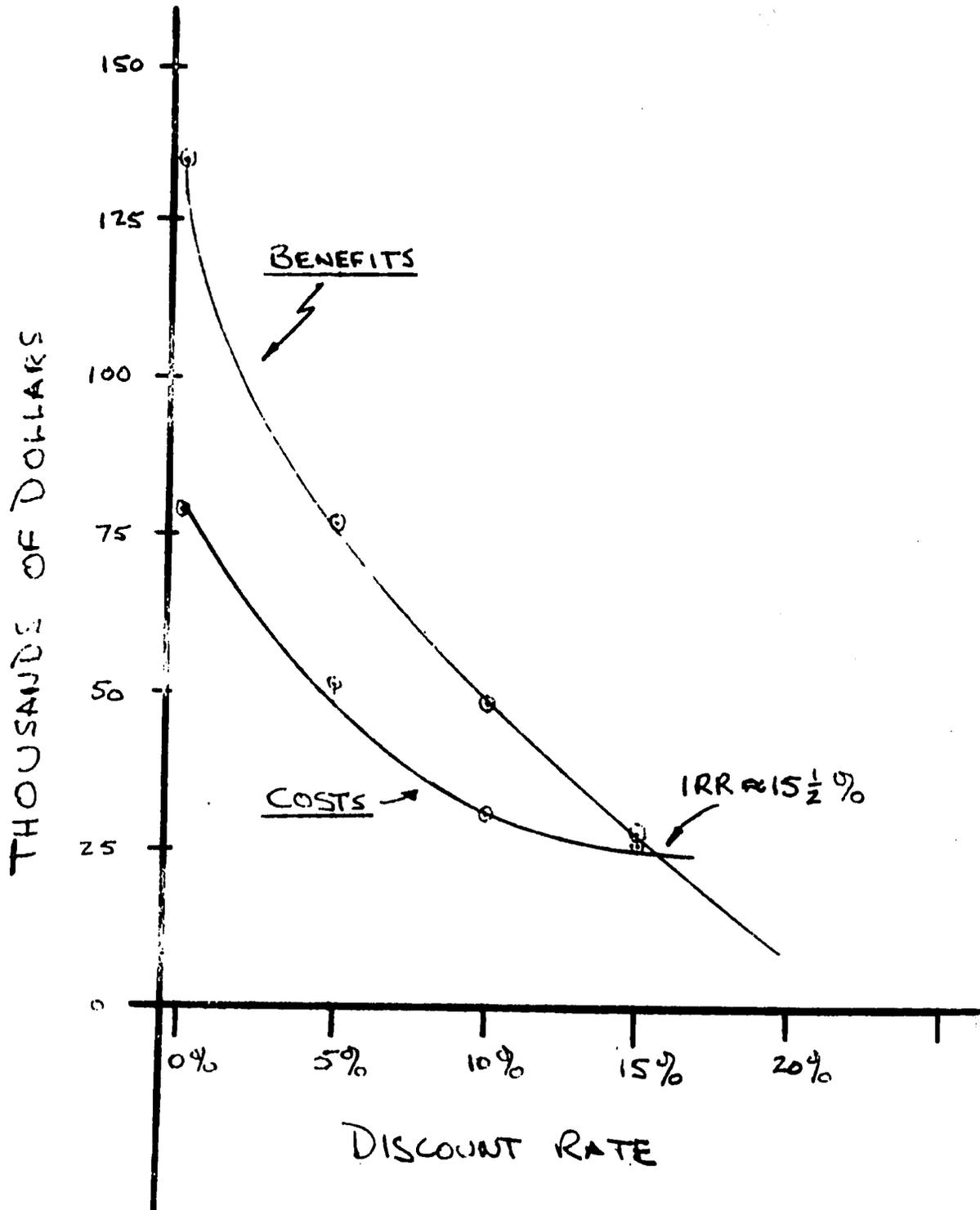


TABLE H-2: INTERNAL RATE OF RETURN -- COSTS

(\$000)

Year	Operating Costs Less Depr. & Int.	Capital Additions	Total Costs (0%)	Discount (5%)	Discount (10%)	Discount (15%)
1973	\$ 1,091	\$ 212	\$ 1,303	\$ 1,303	\$ 1,303	\$ 1,303
74	2,315	423	2,738	2,606	2,488	2,382
75	2,555	3,736	6,291	5,705	5,198	4,756
76	1,756	3,289	5,045	4,358	3,788	3,315
77	1,730	1,105	2,835	2,333	1,937	1,622
78	1,966	965	2,931	2,295	1,821	1,457
79	2,036	1,866	3,902	2,912	2,201	1,686
1980	1,783	4,450	6,233	4,431	3,198	2,344
81	2,666	1,361	4,027	2,762	1,877	1,317
82	2,548	677	3,225	2,080	1,367	916
83	2,731	743	3,474	2,133	1,338	858
84	2,859	979	3,838	2,245	1,343	825
85	2,941	1,565	4,506	2,510	1,437	843
86	3,106	764	3,870	2,051	1,123	631
87	3,298	982	4,280	2,161	1,126	603
88	3,419	1,086	4,505	2,167	1,077	554
89	3,541	1,197	4,738	2,170	1,033	507
1990	3,699	1,341	5,040	2,197	998	469
91	3,897	1,460	5,357	2,224	964	434
92	4,028	1,576	5,604	2,219	913	392
Totals	\$ 53,965	\$ 29,777	\$ 83,742	\$ 52,862	\$ 36,530	\$ 27,214

TABLE H-3: INTERNAL RATE OF RETURN -- BENEFITS

(\$000)

Year	Local Revenues	International Revenues	Total Benefits (0%)	Discount (5%)	Discount (10%)	Discount (15%)
1973	\$ 1,003	\$ 723	\$ 1,726	\$ 1,726	\$ 1,726	\$ 1,726
74	1,009	813	1,822	1,734	1,655	1,585
75	1,015	928	1,943	1,762	1,605	1,469
76	1,021	1,040	2,061	1,780	1,548	1,354
77	2,042	1,163	3,205	2,637	2,189	1,833
78	2,624	1,317	3,941	3,086	2,448	1,959
79	3,167	1,494	4,661	3,478	2,629	2,014
1980	3,553	1,720	5,273	3,749	2,706	1,983
81	3,674	1,955	5,629	3,811	2,624	1,841
82	3,819	2,271	6,090	3,927	2,582	1,730
83	3,946	2,601	6,547	4,020	2,522	1,617
84	4,009	2,982	6,991	4,089	2,447	1,503
85	4,128	3,342	7,470	4,162	2,382	1,397
86	5,046	3,851	8,897	4,715	2,581	1,450
87	5,111	4,319	9,430	4,761	2,480	1,330
88	5,176	4,858	10,034	4,827	2,398	1,234
89	5,641	5,476	11,117	5,090	2,424	1,190
1990	5,750	6,186	11,936	5,204	2,363	1,110
91	6,762	7,000	13,762	5,713	2,477	1,115
92	6,811	7,934	21,962*	8,695	3,580	1,340
Totals	\$ 75,307	\$ 61,973	\$ 144,497	\$ 78,966	\$ 47,366	\$ 30,780

* Includes \$7,217 residual value of equipment. In our opinion, because of depreciation methods used the actual value in fact equals book value at that period in time.

CHECKLIST OF STATUTORY CRITERIA
DEVELOPMENT LOAN FUND

I. COUNTRY PERFORMANCE

A. Progress Towards Country Goals

1. FAA Secs. 201 (b)(5), 201 (b)(7), 201(b)(8), 208.

Discuss the extent to which the country is:

(a) Making appropriate efforts to increase food production and improve means for food storage and distribution.

The GOL's five year development plan 1972-1976 for Agriculture and Forestry puts the agriculture sector as top priority in development of the economy. A primary goal is to diversify agriculture production by increasing production of rice, tree crops, and livestock production. There are price support schemes, and new milling and warehouse facilities.

(b) Creating a favorable climate for foreign and domestic private enterprise and investment.

Liberia has reaffirmed the Open Door Policy by creating incentives to investors and to attract foreign investment, which is responsible for most of the economic development of the country. Both foreign investment and national entrepreneurs are encouraged to participate.

(c) Increasing the people's role in the developmental process.

The government's policy is to create balanced and sustained economic progress of all parts of the country through integrated rural and urban regional development programs. Considerable efforts are being made in the educational field at all levels.

(d) Allocating expenditures to development rather than to unnecessary military purposes or intervention in other free countries' affairs.

The level of military expenditure is minimal (6% budget in 1971) and limited to that required to insure internal order^{and} stability.

(e) Willing to contribute funds to the project or program.

See Sections II and IV for GOL contribution.

(f) Making economic, social, and political reforms such as tax collections improvements and change in land tenure arrangement; and making progress toward respect for the rule of law, freedom of expression and of the press, and recognizing the importance of individual freedom, initiative, and private enterprise.

The GOL has recently taken steps to strengthen government operations and tighten management and administrative practices. President Tolbert has taken disciplinary action against several officials for corruption, and introduced new tax measures. More land is being made available for production, and there is considerable freedom of the press.

(g) Responding to the vital economic, political, and social concerns of its people, and demonstrating a clear determination to take effective self-help measures.

The GOL is attempting, through the building of a resource base by increasing export crops & through agricultural projects aimed at the village level, to effectuate economic and social reforms for the improvement of living standard. Improved telecommunications can play an important role in integrating the entire economy towards development.

B. Relations with the United States

1. FAA Sec. 620 (c). Is the government indebted to any U.S. citizen for goods or services furnished or ordered where: (a) such citizen has exhausted available legal remedies, including arbitration, or (b) the debt is not denied or contested by the

None to our knowledge.

government, or (c) the indebtedness arises under such government's, or a predecessor's unconditional guarantee?

2. FAA Sec. 620(d). If the loan is intended for construction or operation of any productive enterprise that will compete with U.S. enterprise, has the country agreed that it will establish appropriate procedures to prevent export to the U.S. of more than 20% of its enterprise's annual production during the life of the loan?

Not applicable.

3. FAA Sec. 620(e)(1). Has the country's government, or any agency or subdivision thereof, (a) nationalized or expropriated property owned by U.S. citizens or by any business entity not less than 50% beneficially owned by U.S. citizens, (b) taken steps to repudiate or nullify existing contracts or agreements with such citizens or entity, or (c) imposed or enforced discriminatory taxes or other exactions, or restrictive maintenance or operation conditions? If so, and more than six months has elapsed since such occurrence, identify the document indicating that the government, or appropriate agency or subdivision thereof, has taken appropriate steps to discharge its obligations under international law toward such citizen or entity? If less than six months has elapsed, what steps if any has it taken to discharge its obligations?

No.

4. FAA Sec. 620(j). Has the country permitted, or failed to take adequate measures to prevent, the damage or destruction by mob action of U.S.

No.

property, and failed to take appropriate measures to prevent a recurrence and to provide adequate compensation for such damage or destruction?

5. FAA Sec. 620(1). Has the government instituted an investment guaranty program under FAA Sec. 221(b)(1) for the specific risks of invertibility and expropriation or confiscation? Yes.

6. FAA Sec. 620(o): Fisherman's Protective Act of 1954, as amended, Section 5. Has the country seized, or imposed any penalty or sanction against, any U.S. fishing vessel on account of its fishing activities in international waters? If, as a result of a seizure, the U.S.G. has made reimbursement under the provisions of the Fisherman's Protective Act and such amount has not been paid in full by the seizing country, identify the documentation which describes how the withholding of assistance under FAA has been or will be accomplished. No.

7. FAA Sec. 620(q) Has the country been in default, during a period in excess of six months, in payment to the U.S. on any FAA loan? No.

8. FAA Sec. 620(t). Have diplomatic relations between the country and the U.S. been severed? If so, have they been renewed? No.

C. Relations with Other Nations and the U.N.

1. FAA Sec. 620(i). Has the No.

country been officially represented at any international conference when that representation included planning activities involving insurrection or subversion directed against the U.S. or countries receiving U.S. assistance?

2. FAA Sec. 620(a); 620(n). Has the country sold, furnished, or permitted ships or aircraft under its registry to carry to Cuba or North Viet-Nam items of economic, military, or other assistance? No.

3. FAA Sec. 620(u); App. Sec. 108. What is the status of the country's U.N. dues, assessments, or other obligations? Does the loan agreement bar any use of funds to pay U.N. assessments, dues, or arrearages?

To the best of our knowledge Liberia is up to date on its U.N. dues, assessments, and other obligations. Yes, the loan agreement limits the use of loan funds for the specific project.

D. Military Situation

1. FAA Sec. 620(i). Has the country engaged in or prepared for aggressive military efforts directed against the U.S. or countries receiving U.S. assistance? No.

2. FAA Sec. 620(s). What is (a) the percentage of the country's budget devoted to military purposes, and (b) the amount of the country's foreign exchange resources used to acquire military equipment? Is the country diverting U.S. development assistance or P.L. 480 sales to military expenditures? Is the country diverting

- (a) 6%.
- (b) Minimal foreign exchange is spent on military equipment.
- (c) No.
- (d) No.
- (e) No.

its own resources to un-
necessary military expendi-
tures? Has the country spent
money for sophisticated weapons
systems?

II. CONDITION OF THE LOAN

A. General Soundness

- Interest and Repayment

1. FAA Secs. 201(d), 201(b)(2).
Is the rate of interest excessive
or unreasonable for the borrower?
Are there reasonable prospects
for repayment? What is the grace
period interest rate; the following
period interest rate? Is the
rate of interest higher than the
country's applicable legal rate
of interest?

Rate of interest is not
excessive or unreasonable, and
repayment prospects are favor-
able. Loan is a two step
arrangement. Grace period to
GOL is 10 years with 2% inter-
est. During remaining 30 years
interest is 3%. The Borrower,
PUA, will repay the loan to
the Government in 30 years.
Grace period is 5 years with
3 1/2%, and 3 1/2% during last 25
years. Rate of interest is
less than applicable legal
rate in country.

-- Financing

1. FAA Sec. 201(b)(1). To what
extent can financing on reason-
able terms be obtained from
other free-world sources, including
private sources within the U.S.?

Financing from other free-
world sources, including pri-
vate sources within the U.S.,
is not available. See Section
IV of CAP.

-- Economic and Technical Soundness

1. FAA Sec. 201(b)(2), 201(e).
The activity's economic and tech-
nical soundness to undertake
loan; does the loan application,
together with information and
assurances, indicate that funds
will be used in an economically
and technically sound manner?

Yes. See Section II, III and
IV of CAP.

2. FAA Sec. 611(a)(1). Have
engineering, financial, and
other plans necessary to carry
out assistance, and a reason-
ably firm estimate of the cost
of assistance to the U.S., been
completed?

Yes. See Sections II and IV
of CAP.

3. FAA Sec. 611(b); App. Sec. 101.

Not applicable.

If the loan or grant is for a water or related land resource construction project or program, do plans include a cost-benefit computation? Does the project or program meet the relevant U.S. construction standards and criteria used in determining feasibility?

4. FAA Sec. 611(e). If this is a Capital Assistance Project with U.S. financing in excess of \$1 million, has the principal A.I.D. officer in the country certified as to the country's capability effectively to maintain and utilize the project?

Yes.

B. Relation to Achievement of Country and Regional Goals.

-- Country Goals

1. FAA Secs. 207, 281(a). Describe this loan's relation to:

a. Institutions needed for a democratic society and to assure maximum participation on the part of the people in the task of economic development.

The project is important in providing improved communications within capital city as well as improved interregional and international services. These facilities are necessary in increasing the country's GNP as well as integrating rural and urban regional development programs.

b. Enabling the country to meet its food needs, both from its own resources and through development, with U.S. help, of infrastructure to support increased agricultural productivity.

Assisting the economy through the improvement of its infrastructure, in this case communications, will also directly benefit agriculture production programs.

c. Meeting increasing need for trained manpower.

Adequate training will be provided to the Borrower to assure

efficient operations and maintenance of the expanded system. This will contribute to the skills of the Liberian Telecommunications technicians.

d. Developing programs to meet public health needs.

Better communications will be useful in providing better medical and health service.

e. Assisting other important economic, political, and social development activities, including industrial development; growth of free labor unions; cooperatives and voluntary agencies; improvement of transportation and communication systems; capabilities for planning and public administration; urban development; and modernization of existing laws.

Adequate and reliable communications are a vital necessity for all the types of development noted (See Section III and IV of CAP). By serving a number of the most important cities and agriculture regions of the country, it will make an important contribution to Liberia's overall development plan.

2. FAA Sec. 201(b)(4). Describe the activity's consistency with and relationship to other development activities, and its contribution to realizable long-range objectives.

See Section III of CAP.

3. FAA Sec. 201(b) (9). How will the activity to be financed contribute to the achievement of self-sustaining growth?

As indicated in the CAP, this project will perform an integrating function with respect to multinational economic activity in Liberia. Thus, an expanded telecommunications network is a long-term objective of the GOL.

4. FAA Sec. 201(f). If this is a project loan, describe how such project will promote the country's economic development, taking into account the country's human and material resource requirements and the relationship

See Section III of CAP.

between ultimate objectives of the project and overall economic development.

5. FAA Sec. 201(b) (3).

In what ways does the activity give reasonable promise of contributing to development of economic resources, or to increase of productive capacities?

See Section III of CAP.

6. FAA Sec. 281(b). How does the program under which assistance is provided recognize the particular needs, desires, and capacities of the country's people; utilize the country's intellectual resources to encourage institutional development; and support civic education and training in skills required for effective participation in political processes.

Better communications will provide greater national and international contact and exchange and permit the Government to be more responsive to the needs of the people.

7. FAA Sec. 601(a). How will this loan encourage the country's efforts to: (a) increase the flow of international trade; (b) foster private initiative and competition; (c) encourage development and use of cooperatives, credit unions, and savings and loan associations; (d) discourage monopolistic practices; (e) improve technical efficiency of industry, agriculture, and commerce; and (f) strengthen free labor unions?

See Section III of CAP.

8. FAA Sec. 202(a). Indicate the amount of money under the loan which is: going directly to private enterprise; going to intermediate credit institutions or other borrowers for use by private enterprise; being used to finance imports from private sources; or otherwise being used to finance procurements from private sources.

Approximately \$8.0 million of the loan is to be used for the import of equipment from private manufacturers and for technical services from private firms. Up to \$500,000 will be used for the procurement of local goods and services from private sources.

9. FAA Sec. 611(a)(2).
What legislative action is re-
quired within the recipient
country? What is the basis for
a reasonable anticipation that
such action will be completed
in time to permit orderly accom-
plishment of purposes of loan?

None required.

-- Regional Goals

1. FAA Sec. 619. If this loan
is assisting a newly indepen-
dent country, to what extent do
the circumstances permit such
assistance to be furnished
through multilateral organiza-
tions or plans?

Multilateral institutions are
contributing to the transporta-
tion and agricultural sectors.
This project will complement
these efforts, and should in-
directly increase Liberia's
overall GNP.

2. FAA Sec. 209. If this loan
is directed at a problem or an
opportunity that is regional
in nature, how does assistance
under this loan encourage a
regional development program?
What multilateral assistance is
presently being furnished to
the country?

See Section III and IV of CAP.

C. Relation to U.S. Economy

-- Employment, Balance of Payments,
Private Enterprise.

1. FAA Secs. 201(b)(6); 102, Fifth.
What are the possible effects
of this loan on U.S. economy,
with special reference to areas
of substantial labor surplus?
Describe the extent to which
assistance is constituted of
U.S. commodities and services,
furnished in a manner consis-
tent with improving the U.S.
balance of payments position.

Approximately \$8.0 million
of the loan will be used for
the procurement of Code 941
goods and services. However,
because of the technical re-
quirements only U.S. firms
will probably be able to supply
the necessary equipment. Without
the AID loan U.S. equipment
and the eventual replacement
parts would not be used. There
is no special applicability to
areas of substantial labor
surplus.

2. FAA Secs. 612(b), 636(h).

What steps have been taken to assure that, to the maximum extent possible, foreign currencies owned by the U.S. and local currencies contributed by the country are utilized to meet the cost of contractual and other services, and that U.S. foreign-owned currencies are utilized in lieu of dollars?

No U.S. foreign owned currencies available for project. The GOL will contribute to the project. See Section IV of the CAP.

3. FAA Sec. 601(d); App. Sec. 109.

If this loan is for a capital project, to what extent has the Agency encouraged utilization of engineering and professional services of U.S. firms and their affiliates? If the Loan is to be used to finance direct costs for construction, will any of the contractors be persons other than qualified nationals of the country or qualified citizens of the U.S.? If so, has the required waiver been obtained?

The loan agreement restricts procurement of these services to Liberia and Code 941 countries, which included the U.S. The loan agreement contains standard AID clause in regard to third-country nationals.

4. FAA Sec. 608(a). Provide information on measures to be taken to utilize U.S. Government excess personal property in lieu of the procurement of new items.

The draft loan agreement contains the standard AID clause in this regard.

5. FAA Sec. 602. What efforts have been made to assist U.S. small business to participate equitably in the furnishing of commodities and services financed by this loan?

AID procedures will be followed to provide notice of intended procurement to U.S. small business

6. FAA Sec. 621. If the loan provides technical assistance, how is private enterprise on a contract basis utilized? If the facilities of other Federal agencies will be utilized, in what ways are they particularly suitable; are they competi-

Technical assistance will be provided on a contract basis. No other Federal agency involved.

tive with private enter-
prise (if so, explain); and
how can they be made available
without undue interferences
with domestic programs?

7. FAA Sec. 611(c). If this
loan involves a contract
for construction that obli-
gates in excess of \$100,000,
will it be on a competitive
basis? If not, are there fac-
tors which make it impracticable?

All construction contracts will
be let on a competitive basis.

-- Procurement

1. FAA Sec. 604(a). Will com-
modity procurement be restrict-
ed to U.S. except as otherwise
determined by the President? Yes.

2. FAA Sec. 604(b). Will any
part of this loan be used for
bulk commodity procurement at
adjusted prices higher than
the market price prevailing in
the U.S. at time of purchase? No.

3. FAA Sec. 604(e). Will any
part of this loan be used for
procurement of any agricultural
commodity or product thereof
outside the U.S. when the domes-
tic price of such commodity is less
than parity? No.

D. Other Requirements

1. FAA Sec. 201(b). Is the coun-
try among the 20 countries in
which development loan funds may
be used to make loans in this
fiscal year? Yes

2. App. Sec. 106. Does the loan
agreement provide, with respect
to capital projects, for U.S.
approval of contract terms and
firms? Yes.

3. FAA Sec. 620(k). If the loan is for construction of a productive enterprise, with respect to which the aggregate value of assistance to be furnished will exceed \$100 million, what preparation has been made to obtain the express approval of the Congress? Not applicable.
4. FAA Secs. 620(b), 620(f); App. Sec. 109(b). Has the President determined that the country is not dominated or controlled by the international Communist movement? If the country is a Communist country (including, but not limited to, the countries listed in FAA Sec. 620(f) and the loan is intended for economic assistance, have the findings required by FAA Sec. 620(f) and App. Sec. 109 (b) been made and reported to the Congress? Yes.
5. FAA Sec. 620(h). What steps have been taken to insure that the loan will not be used in a manner which, contrary to the best interest of the United States, promotes or assists the foreign aid projects of the Communist-bloc countries? The loan agreement contains the standard AID clause in this regard.
6. App. Sec. 110. Will any funds be used to finance procurement of iron and steel products for use in Viet-Nam other than as contemplated by Sec. 110? No.
7. FAA Sec. 636(i). Will any part of this loan be used in financing non-U.S. manufactured automobiles? If so, has the required waiver been obtained? No.
8. FAA Secs. 620(a)(1) and (2), 620(p); App. Sec. 117. Will any assistance be furnished No.

or funds made available to the government of Cuba or the United Arab Republic?

9. FAA Sec. 620(g). Will any part of this loan be used to compensate owners for expropriated or nationalized property? If any assistance has been used for such purpose in the past, has appropriate reimbursement been made to the U.S. for sums diverted?

No. No such assistance has been used for this purpose.

10. FAA Sec. 201(f). If this is a project loan, what provisions have been made for appropriate participation by the recipient country's private enterprise.

Construction of necessary buildings, site preparation, and access roads will be carried out by firms in the recipient country.

11. App. Sec. 104. Does the loan agreement bar any use of funds to pay pensions, etc., for persons who are serving or who have served in the recipient country's armed forces?

Yes. The loan agreement limits the use of loan funds for the specific project.

12. MMA Sec. 901, b. Does the loan agreement provide, for compliance with U.S. shipping requirements, that at least 50% of the gross tonnage of all commodities financed with funds made available under this loan (computed separately by geographic area for dry bulk carriers, dry cargo liners, and tankers) be transported on privately owned U.S.- flag commercial vessels to the extent such vessels are available at fair and reasonable rates for U.S. flag vessels. Does the loan agreement also provide for compliance with U.S. shipping requirements, that at least 50% of the gross freight revenues of goods shipped under this loan

Yes.

must be earned by privately owned U.S.- flag commercial vessels to the extent such vessels are available at fair and reasonable rates for U.S.- flag vessels?

13. FAA Sec. 481. Has the country failed to take adequate steps to prevent narcotic drugs from entering the U.S. unlawfully?

No, Liberia is cooperative with the U.S. and international organizations in the control of narcotic drugs.

14. FAA Sec. 604(e). Has there been compliance with restriction against procuring with A.I.D. funds agricultural commodities outside the U.S. when the domestic price of such commodity is less than parity?

No agricultural commodities will be procured with funds provided under this loan.

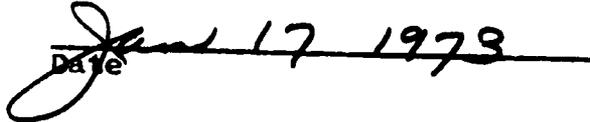
LIBERIA: LIBERIA TELECOMMUNICATIONS EXPANSION
CERTIFICATION PURSUANT TO SECTION 611 (e) OF THE FOREIGN
ASSISTANCE ACT OF 1961, AS AMENDED

I, William C. Wild, Jr., Director of the U.S. A.I.D. Mission to Liberia, do hereby certify that in my judgment the Republic of Liberia will have the financial capability and the human resources capability to implement, maintain, and utilize effectively the subject capital assistance project. This certification takes into consideration the requirements placed on the Republic of Liberia to maintain and utilize other projects previously financed or assisted by the United States.

This judgment is based on the facts, inter alia, that:

1. The Borrower has given a high priority to the expansion of the telecommunications system in its development plan.
2. Past performance in maintaining and utilizing successfully capital assistance provided under other A. I. D. projects.


William C. Wild, Jr.


Date

DRAFT LOAN AUTHORIZATION

Provided From: Development Loan Funds
LIBERIA: Liberia Telecommunications Expansion

Pursuant to the authority vested in the Assistant Administrator for Africa of the Agency for International Development ("A.I.D.") by the Foreign Assistance Act of 1961, as amended, and the delegations of authority issued thereunder, I hereby authorize the establishment of a loan pursuant to Part I, Chapter 2, Title I, the Development Loan Fund, to the Public Utilities Authority of the Republic of Liberia ("Borrower") of not to exceed eight million five hundred thousand dollars (\$8,500,000) to assist in financing the foreign exchange and local currency costs of goods and services for the construction of an expanded telecommunications system, including related management and maintenance training, and the procurement of related support equipment, subject to the following terms and conditions:

1. Interest Rate and Terms of Repayment

- (a) The Borrower shall, in legal tender of the Republic of Liberia, pay to the Government of the Republic of Liberia ("Government"):
 - (i) An amount equivalent to the amount of the Loan within thirty (30) years, including a grace period of not to exceed five (5) years.
 - (ii) Interest at the rate of three and one-half percent ($3\frac{1}{2}\%$) per annum on the unpaid amount payable to the Government under Subparagraph (i) above.
- (b) The Government shall, in United States dollars:
 - (i) Repay the Loan to A.I.D. within forty (40) years, including a grace period of not to exceed ten (10) years.

- (i) Pay A.I.D. interest on the unrepaid principal and any interest accrued thereon at the rate of two percent (2%) per annum during the grace period and three percent (3%) per annum thereafter.

2. Other Terms and Conditions

- (a) Goods and services financed under this Loan shall have their source and origin in Liberia and/or in countries included in Code 941 of the A.I.D. Geographic Code Book.
- (b) Such other terms and conditions as A.I.D. may deem advisable.

Assistant Administrator for Africa

Date